Library

Victory Loan—They finished their job—Let's finish ours!

Contractors and Engineers Monthly

	Route to	See page
1		
2		
3		
4		
5		
6		

Vol. 42, No. 11 NOVEMBER, 1945 $3 a Year, 25 Cents a Copy

Covering the Field

Grading for New Roads
Production data as well as the equipment and methods used on a 1,000,000-yard grading contract are given in an article on this page. Another type of grading, involving heavy rock cuts on a new road location, is described on page 81.

Bridge Construction
Features of the new Hawkesbury River railroad bridge in Australia are told in photos and text on page 2. For a less spectacular but equally essential job, replacing an old truss with an 845-foot reinforced-concrete bridge, see page 53.

Paving Guam's Airfields
Another in our series on military construction in the Pacific deals with the quarry, crushing plant, and asphalt-plant set-up for paving B-29 runways on Guam. See page 6.

Highway Maintenance
Traveling crews with portable hot-mix plants for patching and repairing highway surfaces are a feature of Oregon's maintenance work (page 7).

Concrete Paving
To break in a green paving crew, a contractor laid the median strip on a dual-highway job first. Details of the job are given on page 15.

Battling Snow and Ice
A special serrated blade which aids in removing ice and packed snow from highways is described and illustrated on page 30, while the organization, methods, and equipment for one state highway department's battle with snow and ice are discussed on page 74.

County Road Work
A feature of a midwest county highway department program is its annual bridge inspection and record-keeping. Other phases of its work are also covered in an article on page 33. A suggested plan for providing adequate financing for much needed county road work is outlined on page 86.

Sewer Construction
The use of sheeting and wellpoints in the construction of a new sanitary sewer system was required because of the wet sand and the necessity of working below sea level. See page 39.

Bituminous Paving
An asphalt plant producing 650 tons per 12-hour day for highway resurfacing is laid out for efficiency and safety. See page 57. Two contracts to one firm involved placing a new base and a double bituminous surface treatment on 17,000 square yards of roadway. See page 83.

Building a New Levee
A wide variety of dirt-moving units was used on four sections of a new 395,000-yard levee, to hasten its completion. See page 59.

Expressway Grading A Million-Yard Job

Problems of Wasting Dirt, Selecting Borrow, Placing Below Optimum Moisture, Solved by Lombardo Bros.

By THEODORE REED KENDALL, Editor

✦ WARTIME restrictions on steel-bridge construction, making fills up to 67 feet with material compacted at less than optimum moisture, and incessant rain early in the 1945 working season have marked the three summer construction periods since Lombardo Bros. Construction Co. of Cleveland, Ohio, was awarded the $1,344,000 contract for the first section of the Willow Freeway in Cleveland. This is part of a complete $250,000,000 project initiated by civic interests and highway engineers jointly before the war for construction in ten to twenty-five years to relieve progressively the Cleveland traffic situation.

The current contract was awarded in January, 1942, after advertising prior to December 7, 1941. Actual work was delayed by outside litigation until June, 1943. The nature of the material, a heavy blue clay and silt, makes it impossible to build the high fills except from June through October of each year when the borrow material can be dried to below optimum. At no time during construction has any water been added to the clay-silt material to permit maximum compaction, although a 4-foot blanket course of granulated slag beneath the fills was wet to aid compaction.

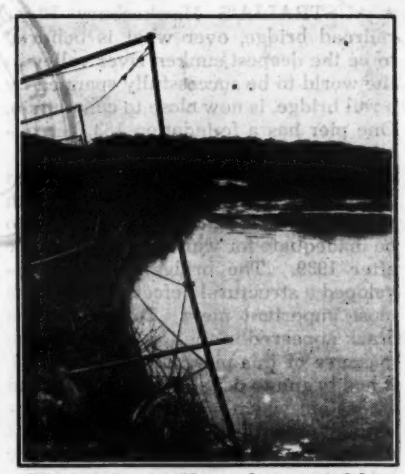
Scope of Project

The Express Highway Plan for the Cleveland metropolitan area is the result of three years' integration of the work of local agencies, which is now endorsed 100 per cent by city, county, and state highway departments, and civic organizations. At the start, six separate maps were submitted by different agencies, giving their solutions of the Cleveland traffic problem. Except for minor variations, these plans were all in agreement. The system of freeways is to be superimposed on the city's own network to relieve traffic on already overloaded city streets. The system consists of a lakeshore drive, five radial freeways, an inner belt drive, and an outer belt drive. The inner belt permits interchange between the freeways without using the local street system. This belt will eventually be the dividing line between the business and residential sections of the city on the walk-to-work idea.

The first construction began in 1942 on the initial section of the Willow Freeway. Plans for the next section of the Willow Freeway north of the present work are 99 per cent complete and the right-of-way is in the acquisition stage, but no money has been exchanged. The delay is due to the time consumed in the negotiations, and to the fact that the people whose dwellings

(Continued on page 19, Col. 4)

Excavation below sea level and heavy moist sand provided problems in laying nearly 15 miles of new sanitary sewer on St. Simons Island, Ga., necessitating the use of a well-point system and sheeting of the trench. Top photo, wood sheeting and cross bracing held the sand in place during pipe-laying operations; lower left, one of the two Northwest Pullshovels used for digging trench; lower right, a barge-mounted Northwest crane lowered the pipe into position across the 320-foot-wide river. See page 39.



Wire mesh on cables and supported by secondhand railroad rails prevents bank erosion along the Salinas River.

Stream Banks Saved From Flood Erosion

Old Railroad Rails, Cable, and Wire Mesh Used to Prevent Encroachment Along River Bank by Flash Floods: Easy to Build or Extend

✦ A SUCCESSFUL solution to the problem of flash floods has been found by Monterey County, Calif., in its recurrent battles against the ravages of the Salinas River. This stream, rising in the steep and barren mountains to the south, is subject to flash floods of moderate duration but considerable intensity which cause severe damage to the county's rich agricultural lands in the broad central valley. This results not so much from inundation, since the channel can usually handle even the maximum discharge of 45,000 cubic feet per second which occurs almost annually, but from bank cutting which threatens encroachment on valuable farm lands or damage to bridges.

Although the average flow of this river for the 13 years on record is 741 cubic feet per second, it becomes completely dry at times and frequently has a flow of less than 10 cubic feet per second for extended periods of time;

(Concluded on page 24)

World's Deepest Bridge Pier Features 2,764-Foot RR Span

Unusual Problems Met in Foundations and Floating Steel Spans to Place in Hawkesbury River Bridge

By MAJOR-GENERAL A. C. FEWTRELL, C. B., D. S. O., V. D., A. M. I. E., (Australia), Chief Civil Engineer, New South Wales Railways

✦ AUSTRALIA'S Hawkesbury River railroad bridge, over what is believed to be the deepest sunken river valley in the world to be successfully spanned by a rail bridge, is now close to completion. One pier has a foundation 183 feet below high water.

The new bridge will replace one built across the river estuary 30 miles north of Sydney in 1885, which was found to be inadequate for war-loaded rail traffic after 1939. The bridge had also developed a structural defect in one of the most important piers. During 1937, a crack appeared in the top portion of the masonry of this pier. In August, 1938, it had begun to develop much faster and a constant watch was kept on it. Subsequent investigation revealed the necessity for the construction of a new bridge.

The Railway Commissioner of New South Wales, Thomas Hartigan, ordered replacement of the old bridge and a sum of £2,000,000 (about $6,500,000) was set aside for the purpose. It was further decided that the work should be done by the New South Wales Railway Department, a state instrumentality, instead of by private contract. After much investigation of the river bed in 1939, it was concluded that the new bridge should consist of eight steel spans: two 450 feet long, each weighing 1,660 tons; four 350-foot steel spans, each weighing 1,040 tons; and two short steel spans, one at each shore end, each weighing 260 tons. The structure is 2,764 feet in length.

The work was begun immediately. The total weight of the steel in the bridge, manufactured by the Australian Broken Hill Proprietary Ltd., at Newcastle, New South Wales, amounts to 8,000 tons.

Foundations

In the foundation work, suitable sites were finally selected for dredging where depths were not more than 170 feet, and the inshore piers were put down at 110 feet below spring-tide high-water level. The deepest pier, No. 5, was founded at 183 feet. At 110-foot depth, two hours was the maximum time per shift that the Australian caisson workers operating in diving bells on the river bed were allowed to remain below, as the work was carried out under heavy air pressure.

The caissons for the new bridge are rectangular in shape, 51 feet long x 29 feet wide, with eight steel dredging tubes, four in each row and 10 feet in diameter. The caisson cutting edge with the eight dredging tubes was fabricated in a slip on the river bank, towed upstream to a deck where reinforced-concrete walls were built up and solid concrete filling placed between the cylinders and the outer skin to a depth which would still allow towing and sinking at the selected site.

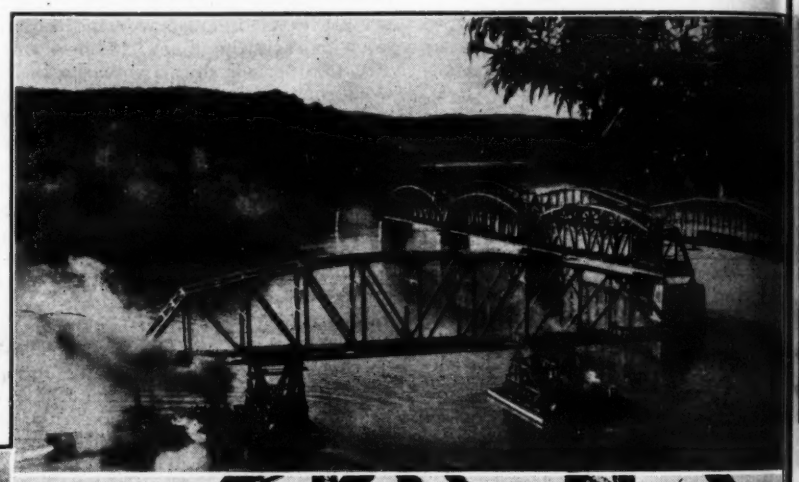
This having been accomplished, dredging proceeded by means of grab buckets lowered into the dredging cylinders. The work of dredging and controlling the waters through the cylinders, at the same time keeping the caisson plumb in the lower depths of mud, required considerable engineering skill. All the caissons successfully reached their resting places and are founded at a depth of 17 feet below high water. After founding the caissons, a plug of concrete several feet thick was placed in the bottom of the dredging cylinders to enable the water to be pumped out and replaced with sand to a height of 80 feet. Another seal of concrete was then installed above the sand which is approximately half-way up the remaining portion of the caisson. This process was continued to the final seal on which were erected the Australian granite piers carrying the steel superstructure.

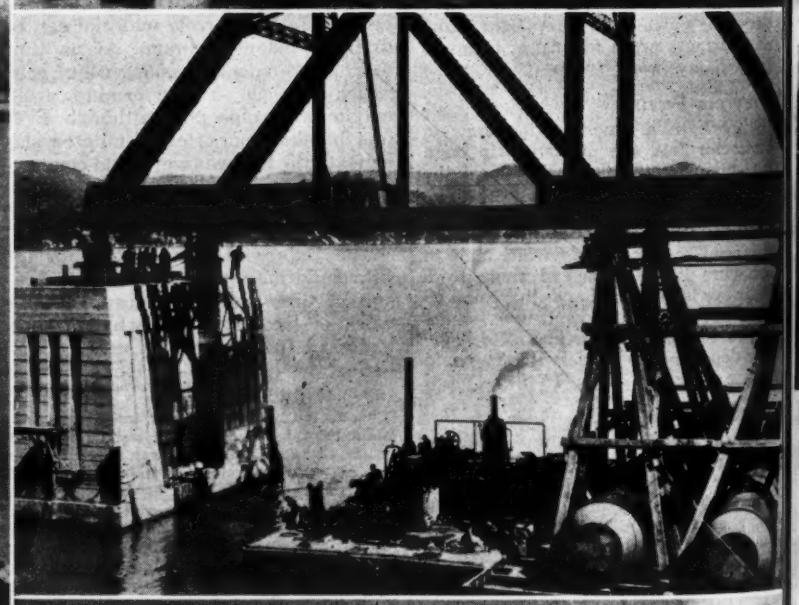
Australian Official Photo

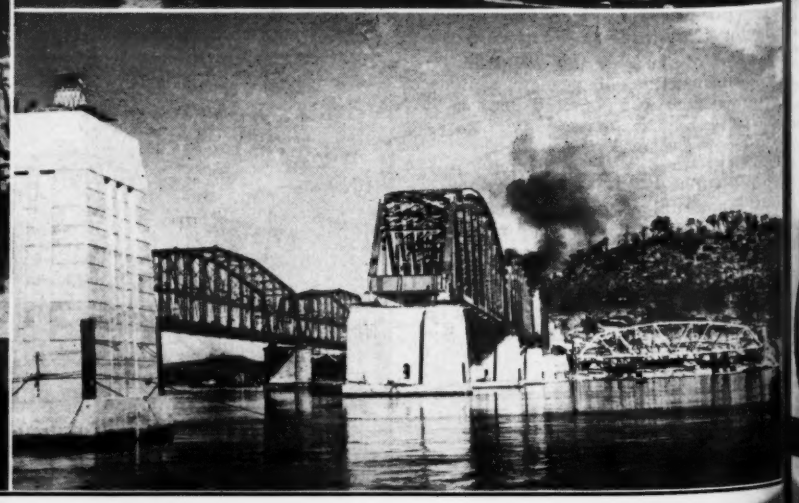
Major-General Fewtrell, who designed and supervised the construction of the Hawkesbury River bridge.

The sinking of the caissons involved new engineering practices. The caisson which was sunk to 183 feet weighed 15,100 tons and consisted of steel, concrete, sand, and fresh water. The maximum load on this caisson for which the bridge is designed is 2,500 tons. The finished weight of the steel span it supports is 1,500 tons, making a total of 19,100 tons to be carried on its base.

(*Concluded on page 65*)

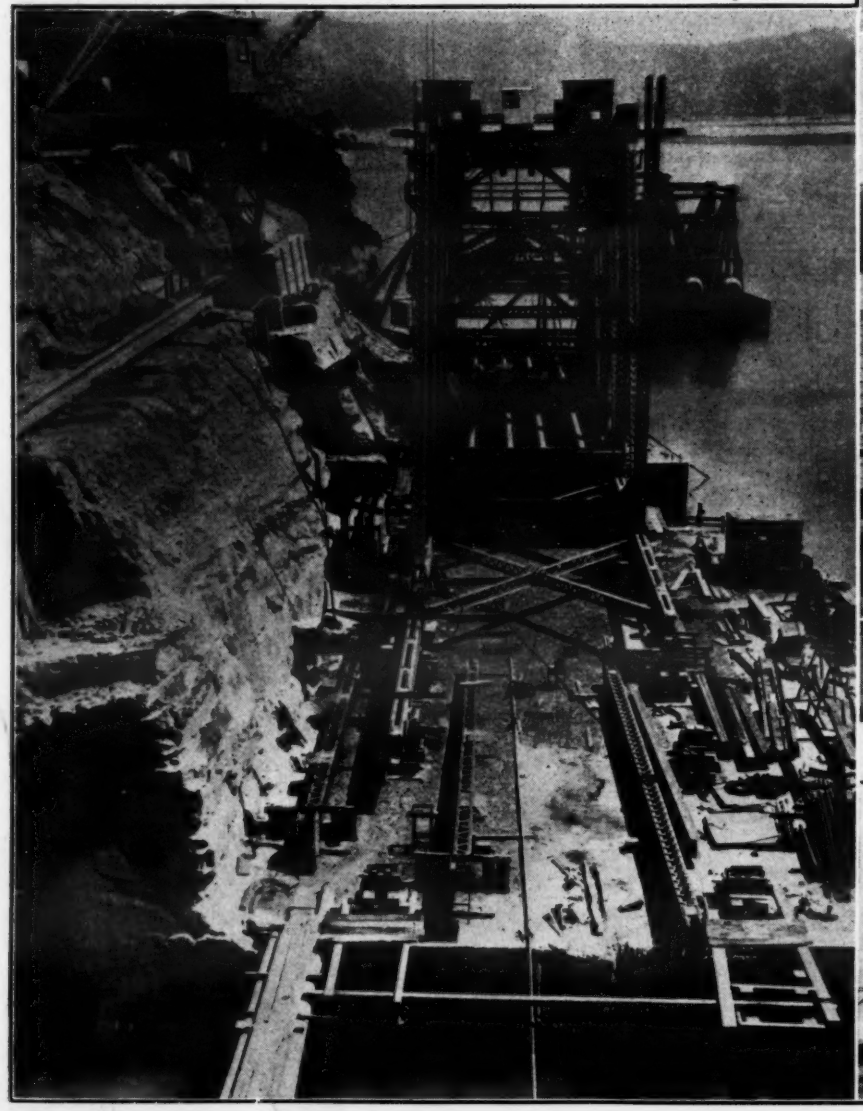






Steps in assembling and placing a steel span in the Hawkesbury River 2,764-foot railroad bridge in New South Wales, Australia. Below, a close-up of the lifting towers and fabrication of a span on the shore. Top right, a 960-ton span on its way to the bridge site. Middle right, the span is swung over the piers and secured in position by cables. As the tide drops, the span settles into place. Bottom right, the new bridge consists of eight steel spans of varying lengths resting on Australian granite.

Australian Official Photos



RENEW WORN HIGHWAYS *economically* WITH TEXACO

Before and after views of U. S. Route 17 in Gloucester County, Va. The worn concrete highway has been resurfaced with a resilient, economical Texaco Sand Asphalt pavement by Sam Finley, Inc.

Laying first course of Texaco Sand Asphalt after giving the old pavement a tack coat of emulsified asphalt.

Half the old road gets new Texaco Asphalt surface while traffic continues to use other half.

This winter, Florida-bound motorists will enjoy 13 miles of the smoothest kind of driving when they reach this section of U. S. Route 17 in Virginia.

A new 3-inch Texaco Sand Asphalt pavement, laid in two courses, has been constructed on the old, worn road by the Virginia Highway Department. Local sand, with particles larger than 3/8-inch removed, provided a low-cost aggregate, which was plant-mixed with a Texaco Asphalt of 85-100 penetration. Before laying the new surface, a tack coat of emulsified asphalt was sprayed lightly on the old pavement.

Virginia is one of many States which have salvaged large mileages of worn roads and streets of various types by resurfacing with one of the plant-mixed group of Texaco Asphalt pavements. Many additional years of thoroughly satisfactory service are obtained by this economical method.

Texaco Engineers, who are Asphalt specialists, will be glad to discuss your paving problem with you and offer their recommendations. Write our nearest office.

TEXACO REG. T. M.

THE TEXAS COMPANY, *Asphalt Sales Dept.*, 135 East 42nd St., New York City (17)

Boston (16) Chicago (4) Denver (1) Houston (1) Jacksonville (2) Philadelphia (2) Richmond (19)

TEXACO ASPHALT

Contractors and Engineers Monthly

THE NATIONAL BUSINESS PAPER FOR CIVIL ENGINEERING CONTRACTORS AND HIGHWAY ENGINEERS AND COMMISSIONERS

Member of Controlled Circulation Audit

Issued Monthly by Buttenheim-Dix Publishing Corp.

Editorial and Business Office: 470 Fourth Ave., New York 16, N. Y.

Acceptance under the Act of June 5, 1934, at Mount Morris, Illinois, authorized March 26, 1945.

Theodore Reed Kendall, Editor
Frank B. Sarles, Western Field Editor — William H. Quirk, Eastern Field Editor
Olive E. Potter, Managing Editor

Edgar J. Buttenheim, President — Donald V. Buttenheim,* General Manager
George S. Conover, Vice President — Herbert K. Saxe, Treasurer
Myron MacLeod, Advertising Manager

BRANCH BUSINESS OFFICES
Chicago 6, Ill., Daily News Bldg., George S. Conover, Vice President; John T. Dix
San Francisco 4, Calif., Mills Bldg., and Los Angeles 13, Calif., Pershing Square Bldg., Duncan A. Scott & Co.

* On leave of absence for military duty.

Copyright 1945 by Buttenheim-Dix Publishing Corp.

Operate Your Own "Juicy Fleet"

You cannot go around skimming oil from the surface of the water in the manner of the Navy's "juicy fleet" to eliminate a dangerous fire hazard during refueling. But you can continue to conserve your lubricating oil, and it is just as important after V-J Day as it was before, for your own benefit.

The Navy takes its salvaged "black gold", that has had to be hauled thousands of miles in tankers, and uses it for oiling roadways at Naval bases and even in power plants.

Any contractor or highway department which operates a considerable fleet of motor vehicles can collect the used crankcase oil by its own "juicy fleet" and take it to a central garage for recovery by one of the standard filtering systems. This not only conserves oil, but saves money for you as a contractor or for the highway department.

Taxpayers Won't Support Poor Plans

The *Sentinel* of Carlyle, county seat of Clinton County in southern Illinois, hits the snag in many post-war plans right on the head in an editorial on the failure of a bond issue to pass at a recent election. Clinton County voters were asked to cast their ballots for a $500,000 bond issue for road improvements. The plan set forth called for the reconstruction of approximately 53 miles of state-aid highways already surfaced with either crushed stone or gravel. The voters tossed the idea out the window to the tune of 3,427 against and 839 for the bond issue. Why? Clinton County is road-minded and wants good state and county highways, but its voters are discerning and know what they need.

The primary reason for the defeat of the proposition by a ratio of over four to one is the fact that the improvement program was not spread over the county on a just and equitable basis, and furthermore it did not provide for any additional mileage of all-weather roads. There is every reason to believe that the taxpayers of the county will give their support to a proposition which will pull each and every main township highway out of the mud first, and then give attention to further improvement of the state-aid roads.

Already a suggestion has been made that a County Highway Improvement Association be created to include the County Superintendent of Highways, Supervisors, Highway Commissioners, and three or five citizens of prominence and influence from each of the fifteen townships in Clinton County, and that the organization be perfected at a county-wide meeting to be called by the Chairman of the Board of Supervisors.

We are glad to report that a rational program of road and bridge construction has been discussed at length by the County Board since the bond issue was voted down. During the discussion of the proposed county-wide highway improvement program, it was pointed out that any final plans must provide all-weather roads as close as possible to all the farm lands in the county to build up the present feeder highways. It is realized that many of the proposals already made will not fit in with the desires of all citizens. However, in any program of this type, the first suggestion must be used as a foundation on which a rational program can be built to use taxpayers' money to the best effect for the largest number.

Controlling Erosion

The photographs reproduced on this page show erosion conditions that can be seen in almost any state, but which can be controlled. The "controlled" illustration shows results that were obtained on an embankment-compaction research project in Indiana (C. & E. M., November, 1944, pg. 8).

Borrow pits can remain as eyesores along post-war construction, or the scars can be healed at minimum cost merely by specifying the rounding of the tops of the slopes and letting the ground cover take over. On the other hand, something has to be done to check the erosion of drainage channels because Nature enlarges rather than repairs such gulleys, once they start. Brush seems to be the best way of choking the flow enough to permit a deposit of silt and thus put an end to such erosion.

Erosion in Indiana of the sheet and gully type, at the right, and below, an eroded channel which drains into a borrow pit. At right below, a fill slope before a good cover of Lespedeza was established.

Public Roads Administration Photos

Most Machine Prices Have Risen 1939-1945

The prices of the major types of construction equipment averaged about 11 per cent higher in June, 1945, than in August, 1939, according to the index of prices of construction machinery issued by the Bureau of Labor Statistics, U. S. Department of Labor. Prices began to advance shortly after the outbreak of the war in Europe and moved steadily upward through January, 1942. Most of the rise was concentrated in the first eleven months of 1941. In July, 1942, the Office of Price Administration established maximum prices for construction machinery generally at levels which prevailed during the last quarter of 1941. After January, 1942, prices remained relatively stable through June, 1945, the last month for which statistics are available.

Using index numbers based on average prices in August, 1939, as 100, the index figure for all groups of construction machinery as of June, 1945, was 110.9. The group of machinery represented by tractor-mounted construction equipment had increased to 109.7, while specialized construction machinery including rippers, rooters, ditchers, tandem rollers, sheepsfoot rollers, wagons, and pumps taken as a group saw a rise in its index number to 111.2.

The third group of construction equipment includes mixers, pavers, spreaders, and related equipment such as bituminous distributors and concrete finishers, and increased in price to 105.7. On the other hand, the fourth group comprising so-called processing equipment, including jaw crushers and roll crushers, had increased in price to an index of 114.5. The fifth group of cranes, shovels, and draglines has increased to 110.4, while the sixth group of dirt-moving equipment, including elevating graders, pull-type and power graders, and scrapers, has risen to 107.5. The rock-drilling machinery, including pavement breakers and rock drills, has maintained its index of 100.0 throughout the entire period from August, 1939, through June, 1945. In contrast to this, the eighth group of track-type tractors has risen to the maximum index figure of 115.8. The last group, composed of portable air compressors of various sizes, has actually dropped in price so that in June, 1945, it carried an index figure of 97.9.

IN THIS ISSUE

Aggregate Production 6
Airports 6, 37
Bituminous Paving 6, 7, 57, 83
Bridges 2, 33, 53
Concrete Construction 15, 53
County Road Work 30, 33, 86
Earth-Consolidation Test 71
Editorials 4
Equipment Shops 43
Grading 1, 81
Highway Maintenance 7
Legal Decisions 67
Levee Construction 59
Plans for Future Work 27, 80
Safety 66
Sewer Construction 39
Snow Removal and Ice Control 30, 74
Stream-Erosion Control 1
Urban Highways 36

An Appeal to Motorists To Prevent Roadside Fires

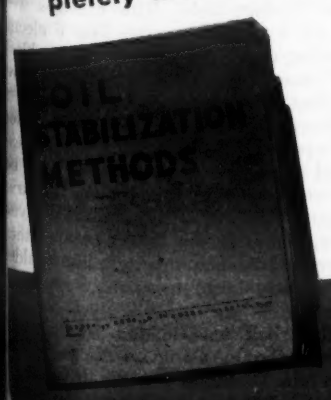
The damage and destructiveness of roadside fires were emphasized in a recent appeal to motorists to help prevent such fires, appearing in an issue of the Illinois Division of Highways' Bulletin. Roadside fires cause thousands of dollars of damage in Illinois every year, the article points out, and most of these fires are caused by lighted cigar and cigarette stubs thrown out by passing motorists.

During the cold and wet seasons, motorists do this as a matter of convenience and it frequently does no immediate harm, but the Bulletin points out that it is difficult to determine when and where it is a safe policy to dispose of lighted stubs in that fashion. Once the habit is formed, one throws lighted stubs during the dry summer season without thinking. The article urged motorists to adopt a practice of always disposing of lighted stubs in a safe manner inside the vehicle and thus prevent any possibility of destructive roadside fires.

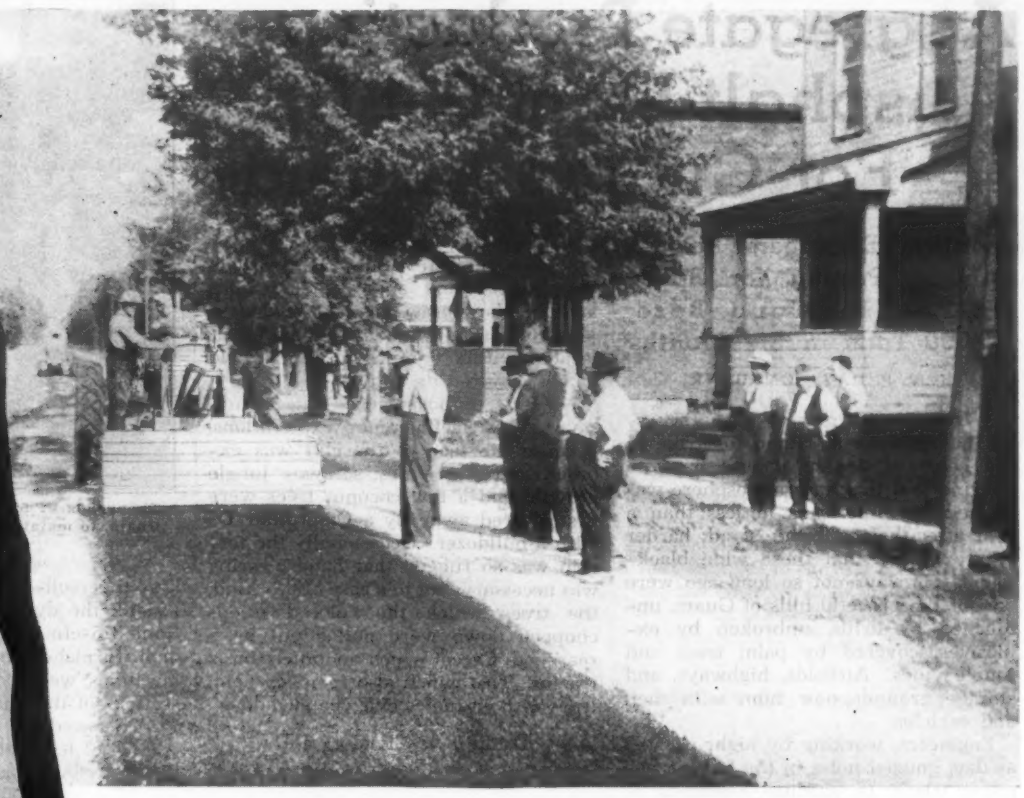
It was also urged that drivers observing an unchecked roadside fire report its location from the nearest telephone and thus help keep a small fire from becoming a large one.

Careful and repeated tests of the mix disclosed perfect uniformity in the thorough distribution of oil and aggregate to the full specified depth.

Heavy "spill-over" of materials ahead of the mixing rotor, obtained by the SEAMAN, means an automatic "re-mix" in each pass; — an important factor in obtaining a large daily output of completely mixed materials.



Convenient, — practical, "Soil Stabilization Methods" compiled by Seaman Engineers is yours on request. Ask for Bulletin E-24.



"THE MIX WAS *ABSOLUTELY PERFECT*"

A letter from Mr. G. Barclay Nicol, Managing Director, General Supply Company of Canada describes a job of bituminous mat construction near Ottawa, Canada. Road mixing was handled by the SEAMAN MIXER. Two methods were employed. Some sections were mixed in the windrow; other sections by operating the SEAMAN on the aggregate spread flat. This latter procedure is especially recommended in the treatment of large areas or in level going. Mr. Nicol writes: *"I was down on Friday to see the completed road and found that the mix was absolutely perfect. They saved a large amount of oil by mixing in this manner against mixing with the motor carriers and probably on the four miles will save enough money in the oil almost to purchase the machine"*. A mile a day of 2 to 3 inch mat comprised of a mix of oil and ¾" screen aggregate, — 16 feet in width was completed, with the SEAMAN handling the road mixing operations.

ALLIED EQUIPMENT DISTRIBUTORS ASSOCIATED MEMBER AEDA

SEAMAN MOTORS

MILWAUKEE 3, WISCONSIN

Aggregate Production, Asphalt-Plant Set-Up For Guam's Airfields

Aviation Engineers Rushed Runway Paving for B-29's On Pacific Island Base; 115,000 Tons in Six Months

By R. P. DAY, CCM, USNR

✦ WHEN B-29's roared down the asphaltic runways at Guam to strike at the heart of Japan, it was hard to imagine that this busy atmosphere was created by Americans in less than a year after they took the island; harder yet to realize that these wide black-topped runways not so long ago were part of the peaceful hills of Guam, untouched by drills, unbroken by explosives, covered by palm trees and jungle vines. Airfields, highways, and storage grounds now hum with men and vehicles.

Engineers, working by night as well as day, gouged holes in the face of this green island to produce hundreds of thousands of tons of crushed rock for the airfields. They did it under almost insurmountable difficulties, beset by weather, hampered by lack of machinery, crowded by impersonal, back-breaking production schedules. In the hurry of the most awful Pacific war of all history, the fine points of laboratory technique and screening may have suffered, but production never did, and the pavement successfully carried the big sky giants when they came home to roost.

Quarry Opened Up

Somewhere near the easterly end of Guam, east of the village of Dededo, an Army Aviation Engineer Battalion operating under the island Naval Construction Brigade opened a rock quarry and set up three portable crushers in series to turn out crushed mineral filler for an asphaltic-concrete mix. In five months of operation, this plant produced 100,000 cubic yards of crushed rock, all of which was used for the construction of runways for the B-29's.

The rock at this end of the island was found to be a weathered coraliferous limestone, composed of animal and nullipore coral, with occasional pockets of pure calcite present. A quarry site was selected at the top of a sheer cliff several hundred feet above the sea. An upland plateau in back of the steep limestone bluff furnished a level spot for the crushing and asphalt plants, and for the storage of asphalt drums. Most important of all, this plant was located within 6 miles of the airfield which required its output.

No tests or borings were necessary, save a few jackhammer explorations, because the face of the cliff was exposed to view. Vines, scrawny jungle growth, and a few coconut trees were first cleared away by a Caterpillar D8 with a bulldozer. Occasionally the terrain was so rugged that hand clearing was necessary, but in a case of this kind, the trees which the colored troops chopped down were pulled out by a rear-end Carco winch mounted on a tractor. This winch also removed palm trees without their being chopped down.

Drilling, a "Tricky" Job

All the treacherous peculiarities to which limestone is heir were encountered in the drilling and shooting of this rock. Guam limestone hardens where it is exposed to the elements. A hard crust, 15 to 20 feet thick, forms on the weathered side. It takes on a pock-marked, grayish appearance, and its drilling is as tricky as its shooting.

The Army Aviation Engineers used four Ingersoll-Rand FM-2 wagon drills to sink the dynamite holes. Ingersoll-Rand 315-cfm compressors, one for each drill, furnished the necessary air. The machines were concentrated on small sections of the quarry at a time. Holes were spaced on 3-inch centers and drilled 12 feet deep, using two lengths of steel. A 6-foot section was used, followed by a 12-foot length to sink each hole to grade. Ingersoll-Rand drill steel and detachable bits were used for the most part, although some Timken steel and bits also were used.

Rock at this quarry was badly cracked and seamed, and for that reason it was found to be very difficult to drill. Hard calcite pockets lay adjacent to soft porous fissures. Drills, penetrating as rapidly as possible through hard calcite, would break through and drop into a soft spot, causing too rapid penetration and consequent sticking of the steel. Furthermore, the tendency of the finished holes to cave in these soft spots caused rock particles to drop down behind the drill bits and wedge them. Many new men were being trained as drillers, and they were particularly susceptible to this misfortune. Attempting to pull drill steel stuck in this way has been harmful to rifle bar nuts on the wagon drills. About 75 per cent of the down time on the wagon drills was traceable directly to this one cause.

Very little could be done about this problem. Officers cautioned their drillers to take it slowly and carefully, but when a hole is "ravelly" enough to cave in above the drill bit, no amount of care seems to prevent stuck steel. By using a 2⅞-inch bit on the first 6 feet of hole and then reducing the diameter to 2¼ inches on the lower 6 feet, the drillers completed about 95 per cent of the holes they started.

Despite the trickiness of drilling, Jackbits did not dull or lose gage very rapidly. In this rock, which weighs 15[illegible] pounds per cubic foot, ordinary rose-type Jackbits lasted through the drilling of about 125 holes 12 feet deep, on the average. Drill bits, when finally dull, were generally discarded at this quarry, although one or two other activities which used more bits, on another part of Guam, resharpened them and rethreaded the steel on an Ingersoll-Rand sharpener.

Each drill averaged fifteen 12-foot holes completed in one 8-hour shift. Production seldom dropped below 15[illegible] feet a shift, and it reached 250 feet in a few cases. Compressors were set at 95-pound pressure, and rock particles which would not pass a No. 10 sieve were successfully blown out of a 12-foot hole.

The holes were not sprung after being drilled. They were loaded from the bottom to within 18 inches of the ground surface, using forty-five ½-pound sticks of 60 per cent gelatin in each 12-foot hole. The charges were set off by instantaneous No. 6 electric blasting caps, hooked to an Atlas blasting machine. This relatively heavy loading was found to be necessary to pulverize the rock to grizzly size. Slotted openings in the grizzly were spaced at 24 inches. While the notes were being assembled for this article, the Army Engineers set off 1,500 pounds of dynamite, and after the smoke cleared there were in evidence only two big boulders sufficiently large to require secondary blasting.

The rock was loaded by a 2-yard Lorain shovel, using an Amsco dipper into four Diamond T 4-ton dump trucks for the 400-foot haul between quarry and grizzly hopper.

(*Continued on page 89*)

Thousands of 52-gallon drums of asphalt were stored in the asphalt-plant yard on Guam, to maintain production of asphaltic concrete for B-29 runways,—a good reason why we were asked to conserve drums here at home.

A battery of three Ingersoll-Rand 315-cfm compressors furnished air for wagon drills working in a quarry on Guam.

A general view of the Army Aviation Engineers' plant on Guam, with the quarry and crushing plant in the background. In six months, this set-up produced 115,000 tons of asphaltic concrete for runway paving.

Highways Maintained With Traveling Crews

In Addition to Section Crews, Fourteen Traveling Outfits Oil Roads and Produce Hot-Mix

By FRANK B. SARLES,
Western Field Editor

MAINTENANCE problems in Oregon are perhaps as varied as those of any state in the Union. From the coastal region of rugged terrain and heavy rainfall, eastward through the comparatively flat and very fertile Willamette Valley, over the Cascade Range, where some of the highest mountains in the country produce difficult snow problems, and on eastward into the desert country of the eastern part of the state where annual rainfall drops to 8 inches or less, the problems vary with the terrain and the climate.

The Oregon State Highway Commission maintains 7,150 miles in the state system, of which 1,950 miles are of high-type bituminous construction, 380 miles are portland-cement concrete, 3,370 miles are of oiled macadam, 1,000 miles are of crushed rock or gravel, and 450 miles, principally secondary highways, are graded only. The annual maintenance expenditure approximates $5,000,000, of which $300,000 is the average spent for snow removal and ice control.

General Organization

Maintenance, as well as construction, is supervised by five Division Engineers, working under the direction of the respective headquarters engineers who in turn report to the State Highway Engineer in the central office at Salem. Mileage in each division is not uniform, being varied in accordance with the amount of traffic and the difficulties of proper maintenance. The Division Engineer at Portland is responsible for 550 miles, mostly high-type highways carrying heavy traffic; the Division at Salem contains 1,250 miles of similar highways; while those at Roseburg, Bend, and La Grande are responsible for 1,360 miles, 1,770 miles, and 2,220 miles, respectively. The actual field work is supervised by District Maintenance Superintendents, of which there are two assigned to the Portland Division, three each at Salem and Roseburg, and four each at Bend and La Grande. These Superintendents are permanently stationed at towns strategically located in the divisions and attend to maintenance in the immediate vicinity of their headquarters, reporting to the Division Engineer.

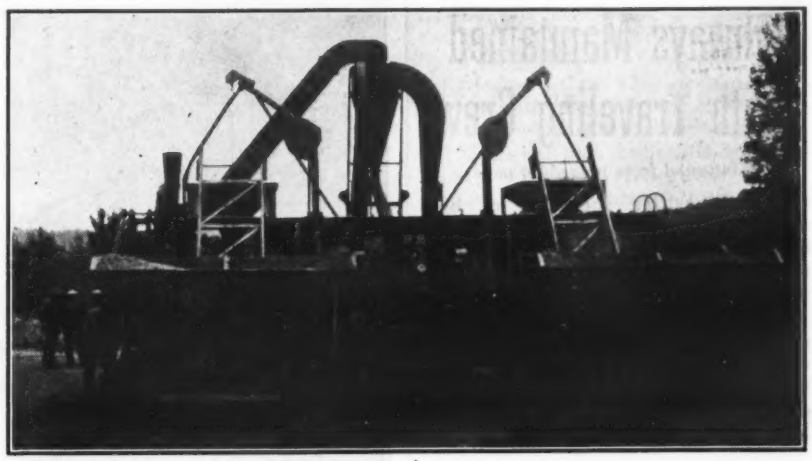
Under the Maintenance Superintendents are section crews, each responsible for all routine repairs, snow removal, and ice control on their sections, which vary in length from 40 to 100 miles, depending on conditions in the section and the amount of traffic carried. About half of the Section Foremen have an assistant and all have one or more truck drivers and two laborers as permanent employees, with additional help being secured, when needed, on an hourly basis. Routine maintenance is all done by the section crews, while more extensive work, bordering on reconstruction, is handled by traveling groups, organized by the central office which schedules and plans the seasonal operations in the five divisions.

Repair facilities for the entire complement of maintenance equipment are available in Salem, Klamath Falls, and La Grande, but, according to Assistant Maintenance Engineer W. W. Stiffler, this distribution of shops equipped to do major repairs is inadequate, and the Department contemplates the construction of additional facilities in five more locations as an early post-war project.

Traveling Organizations

There are fourteen of the traveling organizations, five being equipped for oiling operations and nine with small portable hot-mix plants. Both types of organization are complete units, moved from division to division in accordance with a prearranged plan, and working under the direction of the District Maintenance Superintendent.

The central office schedules the operations of each unit to fill the period from April 1 to October 21 of each year, though an earnest effort is made to complete the scheduled production at an earlier date because of the probability of interference from the weather late in the season.



C. & E. M. Photo
On the charging side of Oregon's portable hot-mix plants are two 2-compartment aggregate bins, each of 8-cubic-yard capacity.

Section Operations

Normally Oregon mows weeds with power mowers every 10 days from the first of April to the end of June, covering the entire area of the right-of-way.

(*Continued on next page*)

• LOOK FOR THE GREEN EDGE WHICH IDENTIFIES GENUINE DOUGLAS FIR PLYFORM PANELS •

The handy PLYFORM calculator shown below will save you time in estimating material needed for constructing any concrete wall with PLYFORM

GENUINE DOUGLAS FIR PLYFORM
TRADE MARK REG. U. S. PAT. OFF.
Concrete Form Panel
D. F. P. A. INSPECTED

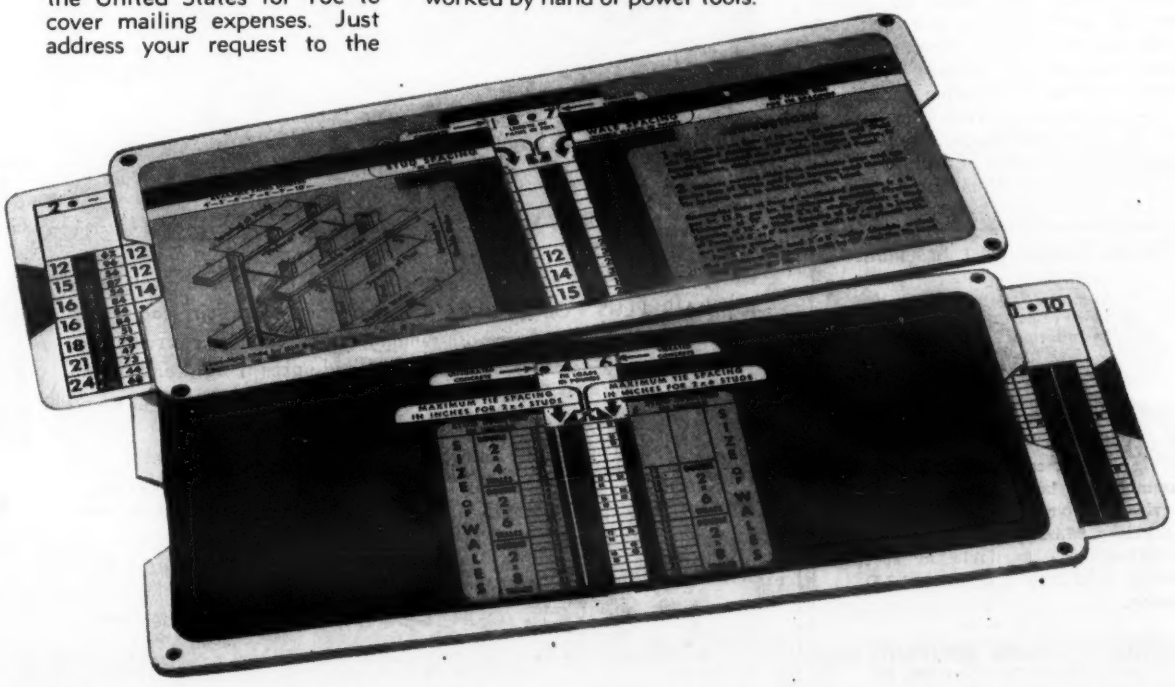
Every panel of Douglas fir plywood PLYFORM carries a distinctive green edge-sealing and a diamond-shaped "grade trade-mark." PLYFORM is the only grade of Douglas fir plywood made especially for concrete form work.

This PLYFORM Calculator contains construction data for building concrete forms of Douglas fir plywood. The slide-rule form of the calculator makes this data almost instantly available—at a glance.

Send for your PLYFORM Calculator today. Priced at $1 for normal sale, this handy calculator will be furnished to engineers and contractors in the United States for 10c to cover mailing expenses. Just address your request to the Douglas Fir Plyw[illegible] Asso[illegible] tion, Tacoma 2, [illegible]

Remember tha[illegible] offers many adva[illegible] concrete form mat[illegible] with highly-resista[illegible] PLYFORM is manufac[illegible] large, strong, rigid pan[illegible] it is light in weight a[illegible]sy to handle. It possesses [illegible]erior nail-holding qualities, resists buckling and warping, is easily worked by hand or power tools. Best of all, it provides a smooth-textured surface—and can be re-used many times. As many as 15 re-uses have been reported!

There is an interesting booklet available — "Concrete Forms of Douglas Fir Plywood." If you do not already have a copy, ask for one when you send for your Calculator.



Mail your requests to DOUGLAS FIR PLYWOOD ASSOCIATION, *Tacoma 2, Washington*

Highways Maintained With Traveling Crews

(Continued from preceding page)

Due to wartime shortages of both men and equipment, however, it has been necessary to limit the area covered to that from backslope to backslope, and to increase the intervals between mowings. Because of the fact that livestock has free access to the highway right-of-way in most counties of the state, little experimenting has been done with the use of chemicals or oil for killing standing vegetation along the roadsides.

Unsurfaced roads are bladed as often as necessary to maintain their surface smoothness and protect shoulders against erosion. Routine work on bituminous-surfaced roads is kept to the minimum compatible with safety and economy, ordinarily being limited to repairing pot-holes or small areas of unsatisfactory surface. Careful planning of the seasonal use of the well organized traveling crews to re-seal and skin-patch distressed areas has proved more economical and satisfactory than extensive operations of this nature by the section crews.

Emergency patches are applied, however, by the section crews, either during the winter months as they become necessary or ahead of the more extensive operations by the traveling organizations. During adverse weather conditions, pot-holes are cleaned out by hand and patched with a pre-mixed material composed of ¾-inch-minus crushed rock and a 100 to 120-penetration paving asphalt with which about 15 per cent of kerosene has been mixed to insure its workability when required for use. During the summer operations of the portable hot-mix plants this "cut-back" is mixed with the aggregates, and the mix, containing 6 per cent asphalt, is stored at the district shops or other convenient locations for use during the winter. When used, it is hauled out in trucks, spread and raked by hand, and traffic-rolled.

Under more favorable weather conditions more extensive patches are made by the section crews, each of which is equipped with a 350-gallon Littleford trailer-type asphalt kettle used in conjunction with a small compressor on the kettle, which is towed by a small truck, to give a 20-pound pressure at the single hose nozzle. Another truck carries two sizes of crushed aggregates in its two-compartment steel body. After cleaning the area to be patched either by hand or power brooming, the crews apply a tack coat of 0.20 gallon of 200 to 300-penetration paving asphalt per square yard, on which is spread 0.012 cubic yard of ¾ to ½-inch crushed rock per square yard, shoveled into place. Another application of 0.25 gallon of asphalt is then made, covered by 0.005 cubic yard of ½ to ¼-inch crushed rock. Asphalt is shipped to convenient locations in tank cars and barreled by the section crew in 55-gallon drums for easy handling on the road by the portable heaters.

This work is ordinarily performed only for emergency repairs; any large areas of surface deterioration are left for summer treatment by either the oiling crews or the portable hot-mix plants, in accordance with the seasonal plans made in advance.

C. & E. M. Photo
A front-end tractor loader is used by Oregon's traveling maintenance crews to load aggregate to the charging bin of the portable hot-mix plant.

Portable Hot-Mix Plants

An outstanding feature of Oregon's maintenance program is the use of portable hot-mix plants. Nine of these plants are used, and the central office schedules an average seasonal output from each plant of approximately 8,000 tons. That is not their maximum capacity, and to avoid too frequent movement, the plants may be scheduled for a considerably heavier seasonal production when the amount of work in a certain district requires it. Under the system which has proved most satisfactory in the state, Oregon awards competitive contracts for producing and stockpiling crushed aggregates, well in advance of their contemplated use. Each district of each division always

(Continued on next page)

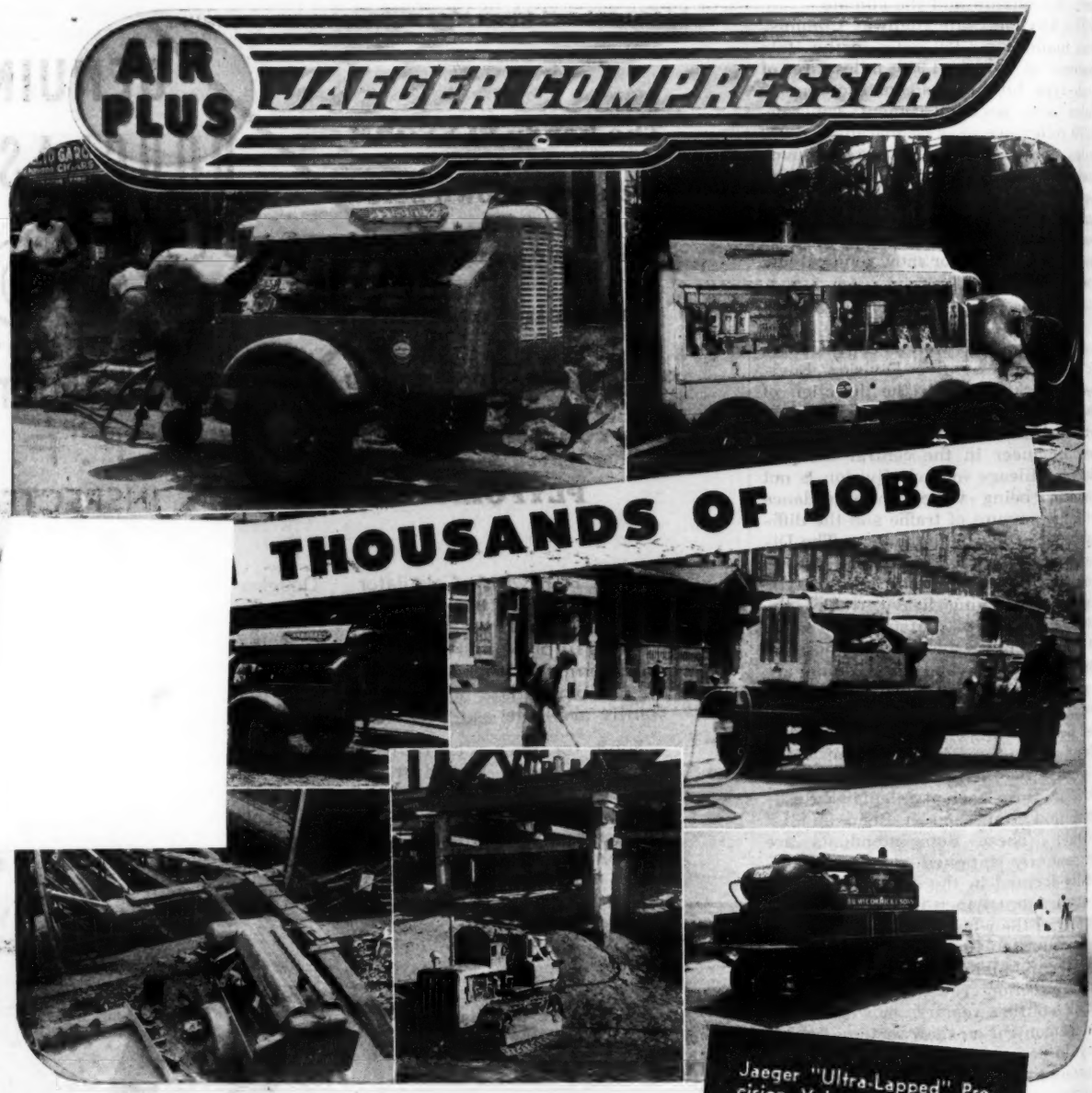
Anchor Flexible Hose Assemblies

For:
- High Pressure
- Medium Pressure
- Low Pressure Installations

Anchor Ductile Sleeve High Pressure Coupling, factory assembled to hose, will give unfailing service on your hydraulically operated machinery. Maximum flexibility and dependable units available in specified lengths from 3/16" I.D. to 1½" I.D. inclusive.

• • • •

ANCHOR COUPLING COMPANY, Inc.
342 N. Fourth St., Libertyville, Ill.
Factory Branch:
12341 Cloverdale Ave., Detroit, Mich.



. . . from coast to coast, Jaeger trailer, truck and tractor-mounted "AIR PLUS" Compressors are delivering more air, cooler air, drier air . . . with smooth-running, precision-built units that set new standards for economy of fuel and upkeep. Sold and served by Jaeger distributors in over 100 cities. *Ask for Catalog JC-5.*

Jaeger "Ultra-Lapped" Precision Valves can hold air above 90 lbs. pressure for 20 to 25 minutes (5 to 10 times longer than others — THAT'S PROOF YOUR TOOLS ARE GETTING ALL THE AIR!

THE JAEGER MACHINE CO., Columbus 16, Ohio.

REGIONAL OFFICES: 8 E. 48th St. NEW YORK 17, N. Y. · 226 N. LaSalle St. CHICAGO 1, ILL. · 235-38 Martin Bldg. BIRMINGHAM 1, ALA.

"FLEET-FOOT" Loaders

"SPEEDLINE" Concrete Mixers

"SURE PRIME" Contractors Pumps

JAEGER *Engineered* EQUIPMENT

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

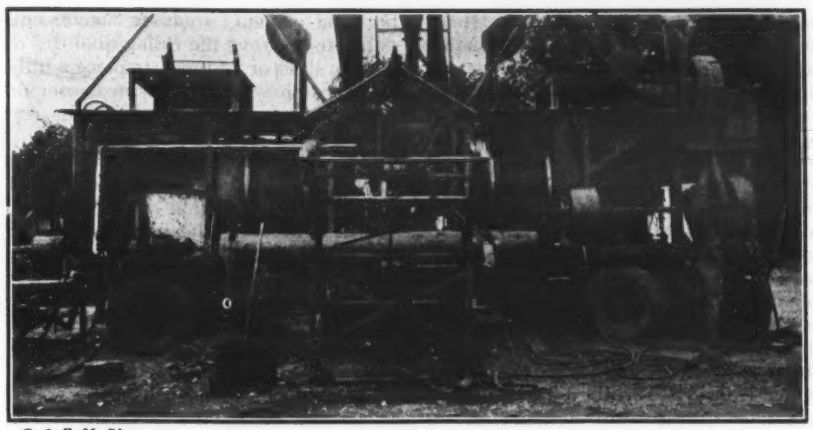
Highways Maintained With Traveling Crews

(Continued from preceding page)

as on hand a large enough supply of these aggregates to provide for routine patching as well as any planned use of the hot-mix plants or oiling crews during their working season.

The portable plants vary somewhat in size and design, since progressive improvements have been made in the later models, all designed by the Oregon Highway Commission and manufactured to its plans and specifications. The plant seen in operation at Oregon City during the 1945 construction season weighs about 17 tons, when dismantled for moving, is supported by its own steel frame riding on eight 34 x 7-inch pneumatic tires, and is towed, during moves, by a 5-ton truck. A separate trailer unit carries the Caterpillar D17000 engine which drives the plant. For moving, the loading skips, which are all pin-connected to the frame of the plant, and the dust collector are removed from the plant and hauled separately to the new location. With a skilled crew the plants can usually be dismantled, moved a few miles, and reassembled, ready to go, in a single day. In use, the power unit is connected directly to the plant, which is supported on four 5-ton ratchet jacks. A 600-gallon asphalt heater is moved on a separate unit and stationed close to the plant. The 100 to 120-penetration paving asphalt used is transported to the plant site in advance in 55-gallon drums. A hand-operated crane raises each barrel of asphalt to the platform on top of the heater and holds it by two hooks on the cable, with its open end inclined downward over the asphalt kettle. One man operates the crane, and when the barrel is in a position to discharge into the heating kettle, he heats it with a blow torch mounted on an 8-foot length of pipe until the asphalt slides into the kettle of its own weight. The kettle, equipped with two more torches, raises the temperature to about 360 degrees and a 1½-inch circulating asphalt pump on the plant transfers it, through a flow meter where it can be accurately measured, to the pugmill.

For drying aggregates, the plant has two circular drums, similar in design to those used on a 10-S concrete mixer, each equipped with a torch heater, and arranged at opposite ends of the plant to be discharged alternately into the pugmill between them. They are loaded with aggregates, independently of each other, by two loading skips pulled up inclined tracks and tripped at the top of their travel to dump the aggregates through a chute into the drying drums. The loading skips are each charged from a separate 2-compartment steel bin of 8-cubic-yard capacity. These bins, which are erected close to the back of the plant, stand only about 7 feet high over a hole dug 2 feet into the ground to accommodate the charging skips at the lower ends of their tracks. The low elevation of the top of the bins permits them to be charged by a ½-cubic-yard front-end loader mounted on a Case wheel tractor which charges both compartments of both bins with the two sizes of aggregate from the stockpiles and also carries the 55-gallon drums of asphalt from their storage area to a place where they can be reached easily by the crane on the platform above the asphalt heater. One man operates the bottom-dump gates of the bins to discharge the two sizes of aggregate, which are proportioned equally by volume, for succeeding batches after the volume-for-designed-weight has been accurately determined on the first few batches from each stockpile of aggregate.

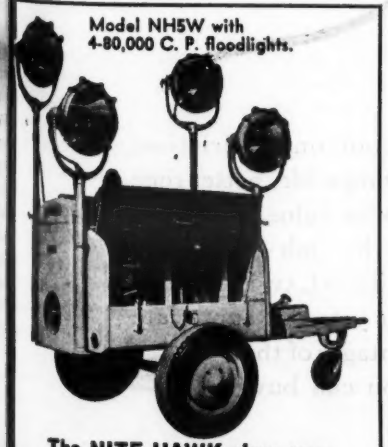


C. & E. M. Photo

On the discharge side of the portable hot-mix plants used in maintaining Oregon's roads is a steep incline up which a cable-operated skip travels to an elevation which permits trip-dumping the mix into trucks.

The aggregates are stockpiled in two sizes, ½ to ¼-inch in one pile, and ¼-inch minus in another, and a mixture of approximately half from each pile provides the specified gradation. A typical analysis of the mix is as follows:

(Continued on next page)



Model NH5W with 4-80,000 C. P. floodlights.

The NITE-HAWK gives you:

LIGHT — Where you want it— when you want it.

POWER — To operate hand tools— saws, drills, hammers, etc.

Floodlight and Searchlight Units up to 14 million candlepower.

Write for Bulletin A.E.D.

LISTER-BLACKSTONE, Inc.

1716 So. 68th Street MILWAUKEE, WIS.

GET ALL THE FACTS

And You'll Get One of These

3 NEW LORAINS

"41" SERIES

Brilliant new performance . . . greater payload capacities . . . longer, lower-cost service life are ready for you now in the new, tested Lorain "41" Series! All these faster, huskier machines ask of anybody is that *you* get the whole story. They'll bring new, profitable efficiency to your operation . . . change future job figures all in your favor!

Let your Lorain distributor show you where, how and how much these Lorain "41" shovels, cranes, clams, drags and hoes can do. How a new shoe-type swing clutch multiplies service life, gives velvet smooth, lightning fast operation . . . how Lorain convertible front end engineering gives you five potential machines in one—crane, clam, drag, shovel and hoe . . . how a dozen other smart new engineering features make these machines high-profit "Musts" for your future jobs!

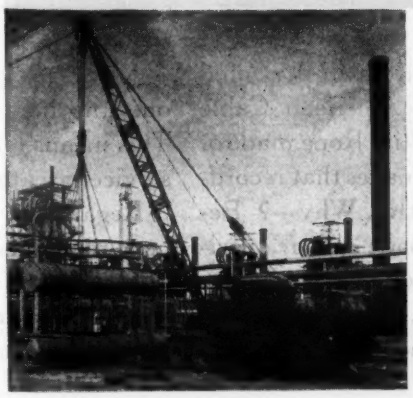
The new "41" Series comes in three models—the Lorain "41" two-speed Crawler; the rubber-tired, two-engined Moto-Crane 414 (6 wheels—4 driven); and the Moto-Crane 416 (6-wheel drive). These machines give you a complete range of travel speeds—from ¾ to 31 MPH—plus a great many profitable new features. All are available with gas, diesel or electric power.

Don't wait! Ask us now for literature giving you all the facts on this latest machinery! Or call your Lorain distributor today.

Send for the new "41" Catalog NOW!

The new Moto-Crane 414 as a fast-traveling shovel. (Below, center.)

The new Moto-Crane 416 — the tough 6-wheel drive machine that took military going in stride. (Below.)



The new Lorain "41" Crawler is bigger, heavier, longer, has 30" wide swamp treads standard.

Reg. Trade Mark

thew-Lorain

THE THEW SHOVEL CO.

LORAIN, OHIO

CRANES · SHOVELS · DRAGLINES · MOTO-CRANES

Highways Maintained With Traveling Crews

(*Continued from preceding page*)

Retained on Sieve	Per Cent
½-inch	5.7
¼-inch	31.0
No. 10	30.8
No. 200	22.8
Passing No. 200	3.5
Asphaltic cement	6.2

The material passing the No. 10 sieve is graded as follows:

Retained on Sieve	Per Cent
No. 40	63.8
No. 80	13.0
No. 200	9.9
Passing No. 200	13.3

No filler is added to the mixture, but the dust collector is so arranged as to drop the coarser particles it catches directly into the pugmill, while the finer material intercepted passes to a bucket at the front of the plant which a laborer empties into the same batch of dried aggregate from which the dust was separated in the drier, after it has been discharged into the pugmill.

An 80-cfm compressor, mounted on the trailer with the D17000 power unit, provides air pressure for operating the three torches, including the one used for discharging the asphalt from barrels to the heater on the asphalt heating kettle, and one in each of the two drying drums of the plant, and also operates the pugmill discharge gates. Gages show air and fuel pressure at all times.

When opened, the pugmill gates discharge the mixed asphaltic concrete into another cable-operated skip, running on a track from a pit excavated under the plant to an elevation high enough in front of it to trip-dump into the waiting truck. A spray nozzle with a hand cut-off is hung beside the clutch of this truck-loading skip, and the waiting truck driver uses it to spray his truck bed with kerosene before he operates the elevator clutch to dump a load into his truck.

Burner fuel is provided from a 300-gallon tank mounted on the asphalt plant, equipped with a pump to fill it from the barrels in which it is delivered. The five burners ordinarily use approximately 400 gallons of kerosene in an 8-hour run. The power unit carries its own 40-gallon tank for diesel fuel, and a trailer unit carries an office for the timekeeper and a 550-gallon tank of gasoline for refueling the trucks used with the operational unit, while another trailer carries a house for the storage of hand tools and lubricants.

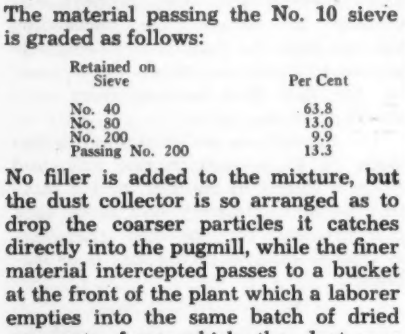
The customary plant crew consists of a foreman, 2 plant operators, one of whom is actually a mechanic and spends much of his time making adjustments and minor repairs, a kettleman, a tractor operator on the front-end loader, 2 laborers, and 2 night watchmen. The average production of this plant for the 1945 season was 104 tons per working day of 8 hours. That low production was all that was needed for the light skin-patching operations which it served. The plant has produced 188 tons of asphaltic concrete in an 8-hour shift.

Road Patching With Hot-Mix

Asphaltic concrete mixed in the portable hot-mix plants is used primarily for thin patches to areas of bituminous surfacing which have deformed under traffic, and to increase or decrease the crown or superelevation, as well as on portland-cement concrete pavement, either to improve the riding qualities of broken slabs or, at times, to place a full-depth patch where a broken corner or larger area has been removed. Its use is under the general supervision and direction of the District Maintenance Superintendent, with a foreman, who travels over the state with the unit, actually directing the patching operation. This foreman, with the District Superintendent, selects and marks the areas to be patched. Behind them follows a crew of three men with a 300-gallon asphalt heater, carrying a 2½-gallon fire extinguisher for its protection. These men outline the patch as marked off by the foreman with a light application of heated asphalt applied through an ordinary garden sprinkling can and then continue placing the asphalt as a light tack coat over the entire area to be patched. This crew also cleans the pavement by hand brooming if necessary. At times, when this tack-coat application is done some distance ahead of the patching its slipperiness is a menace to traffic, so the crew broadcasts a very light application of hot-mix, taken from a passing truck, over the surface.

Delivery of the asphaltic concrete is made by as many of the six 1½-ton trucks available with the traveling organization as the current haul requires, each hauling six of the 1,000-pound batches mixed at the plant at a temperature of 275 degrees. For small patches, three shovelers take the asphaltic concrete directly from the truck and cast it where directed by the three asphalt rakers. For larger patches, part or all of the load may be dumped on the pavement and is distributed by the shovelers. Difficulty in securing men competent to perform this specialized type of raking, for patches of varying thicknesses and with feathered edges, has been a serious hindrance to speedy work but one experienced man has been kept with each outfit to supervise and train the new men. This man, with one shoveler, usually stays one

(*Concluded on next page*)



PROTECT WITH Fultex

TARPAULINS
WIND BREAKS

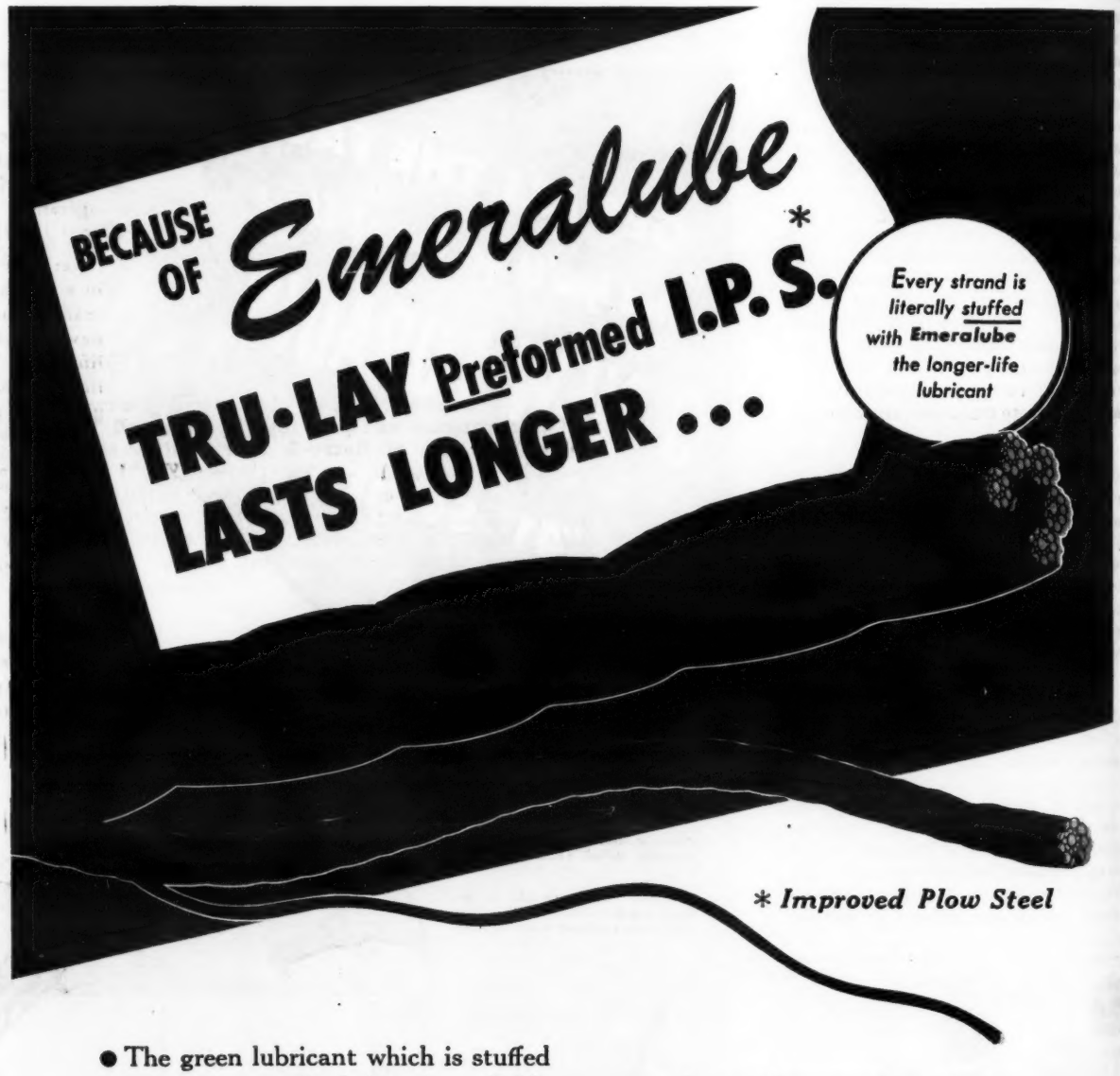
Fultext waterproof covers give economical protection—one of the most widely used, serviceable covers on the market. Recommended for heavy duty and longer wear at low cost.

Quick delivery from stock on standard size covers.

FULTON BAG & COTTON MILLS

Manufacturers since 1870

Atlanta, St. Louis, Dallas, Minneapolis
New York, New Orleans, Kansas City, Kas.


BECAUSE OF Emeralube *
TRU·LAY Preformed I.P.S.
LASTS LONGER . . .
Every strand is literally stuffed with Emeralube the longer-life lubricant

* *Improved Plow Steel*

● The green lubricant which is stuffed into every strand of American Cable TRU•LAY Preformed Wire Rope made of Improved Plow Steel makes that record-breaking rope *still* better. Why—? Because ***Emeralube,*** made to our specifications, clings to the inner wires better, doesn't work out, keeps every wire free from corrosion and able to slip past one another without undue friction. This means longer rope life, better rope service, greater dollar value.

Regardless of the job—for your next rope specify TRU•LAY Preformed ***Emeralube***. Then you will appreciate the multiple advantages of the best wire rope you can buy.

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Bridgeport, Conn.

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

C. & E. M. Photo
Hot-mix for skin-patching this sunken pavement near Portland, Oreg., was produced in one of the State Highway Commission's portable plants.

Highways Maintained With Traveling Crews

(Continued from preceding page)

atch behind the remainder of the crew, dding mixture from a small pile left ehind, if depressions develop under he 6-ton Buffalo-Springfield tandem oller.

Two flagmen direct traffic past the atching operations without serious de- y. A flat-bed truck stays close to the ork, carrying a supply of material rom ¼-inch to dust which the driver roadcasts lightly over the completed atch when it is shaped and rolled to he satisfaction of the foreman. This ruck also carries a 55-gallon drum of ater with a valve and 15 feet of 1-inch ose for transferring it to the tank on he roller, to wet the roller wheels. On t is also a metal can 12 x 24 inches on he bottom, 8 x 24 inches on top, and 8 inches deep, which is filled with erosene in which the rakes and shovels re dipped at intervals to prevent the sphaltic concrete from sticking to them.

Road-Oiling Crews

In addition to the nine traveling hot- ix plants, the Oregon State Highway ommission also uses five well organ- ed and equipped oiling crews that ravel from district to district during he summer season in accordance with lans made in advance. These crews do ormal sealing as well as improvements o grade and cross section.

Load-Checking Operations

Oregon, perhaps even more than any other states, is faced with the anger of serious damage to her high- ay system because of overloaded rucks too often attendant on the heavy umbering operations conducted in any sections. It is a part of the duties f the Maintenance Department, as well s of the State Police, to guard against his menace, and to reduce it as much s possible by educational as well as unitive measures.

The state laws permit a gross load of 4,000 pounds, further restricted by re- uirements as to number of axles, heelbases, and tire widths, but in or- er to facilitate the prosecution of the ar effort, special permits were issued r loads as great as 71,200 pounds. he increase in load required an in- rease in length and additional axles in rder to prevent the overstressing of cilities. However, some individuals, nless carefully watched, persist in verloading and it seems worth while remind those responsible that the amage which can be done to bases and rfacing by the application of loads eavier than those provided for in the riginal design, while slow and progres- ve rather than immediate and spec- cular, as the destruction of a bridge ould be, is just as certain and can be lly as expensive.

Partly with that thought in mind, the aintenance Department includes the ivision of Weighmasters which oper- es an extensive system of load check- g and control of all carriers of logs, les, or piling. At various points throughout the state, fifty roadside scale houses equipped with platforms 28 feet long and 30-ton-capacity truck scales have been erected. These scales are not all manned continuously but are operated by a crew of twenty-four weighers, some of whom travel about the state, working at various hours of the day and night and moving from scale house to scale house without regard to a rigidly set schedule. They man each of the scale houses during their travels, stopping and checking all passing loads of logs and piling, and averaging 15,000 loads per month. In addition to the men who man the fixed scales, four more weighers travel with 20-ton Black & Decker portable Loadometers, used in pairs under each axle, to check loads in out-of-the-way places where the hauling avoids passing the well known scale-house locations. Complete reports of each load weighed are made, which, when assembled and tabulated by the central-office staff, furnish much valuable information for future use in correlating the effect of occasional excessive loads or repeated maximum legal loads on the costs of maintenance.

Personnel

The Maintenance Department of the Oregon State Highway Commission is in charge of E. A. Collier, Maintenance Engineer, aided by Assistant Maintenance Engineer W. W. Stiffler and the five Division Engineers. R. H. Baldock, the Commission's Chief Engineer, was once the Maintenance Engineer and continues his intense interest in this vital phase of the operations of the State Highway Commission.

Dimond Leaves Insley

George J. Dimond, well known in the construction - equipment industry through his long association with Koehring Co. and more recently with Insley Mfg. Corp., has resigned as Vice President in charge of sales and as a director of Insley. Dimond's work for the equipment industry in presenting its needs to various Federal control bureaus during the war has been intensive.

Mr. Dimond has also resigned as a director of the Manufacturers' Division of the American Road Builders' Association in which he has served on the sustaining-membership fund committee and in other activities. His immediate plans are for a much needed vacation.

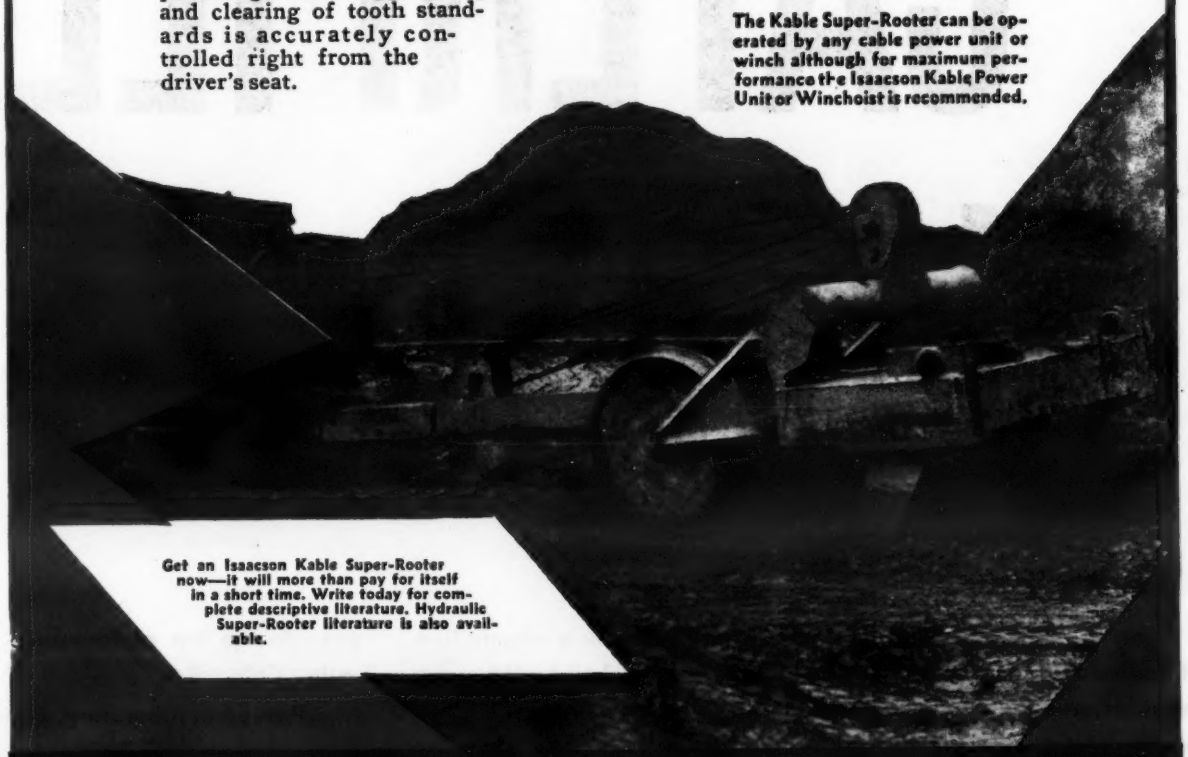
Dozer and Scraper Yardage

Turn an
Isaacson **KABLE SUPER-ROOTER**

loose on hardpan, decomposed granite, sandstone, macadam or other rock-like materials and your digging costs will "hit the skids." You'll see your Kable TracDozer or Karry-Scraper *yardage* shoot right up when you break ground with one of these husky rippers. You'll save wear and tear on your other dirt-moving equipment, *get bigger loads in half the time.* What's more you'll be able to tackle the toughest jobs that come your way, frequently *without blasting.*

Built to take hardest knocks and shocks, the box beam all-welded construction of the heavy duty Super-Rooter will handle the drawbar pull of largest tractors. When more weight is needed just fill the frame with water, sand or punchings. The digging depth and clearing of tooth standards is accurately controlled right from the driver's seat.

The Kable Super-Rooter can be operated by any cable power unit or winch although for maximum performance the Isaacson Kable Power Unit or Winchoist is recommended.



Get an Isaacson Kable Super-Rooter now—it will more than pay for itself in a short time. Write today for complete descriptive literature. Hydraulic Super-Rooter literature is also available.

ISAACSON

A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE

Easy-to-See Weekly Wall Calendar Free

Copies of The Frederick Post Co. 1946 wall calendar, which provides not only large easy-to-read numerals for each week, combined with the current, previous, and following month, but also includes technical data covering wire and sheet metal gages, screw threads, and similar useful information, are now available. The company states that new-style lettering adds to the legibility and attractiveness, plus the practical value of the arrangement which made its 1945 edition so popular.

Requests for one of these 1946 calendars, which may be secured without cost or obligation, should be made direct to The Frederick Post Co., Box 803, Chicago 90, Ill. Just mention this magazine.

SPA Changes Policy Of Governmental Sales

Policies governing the disposal of surplus government property have been changed by an order from the Office of Surplus Property which hastens the disposal of surplus by eliminating the 30-day priority period previously extended to Federal, state, county, and local agencies for the purchase of surplus equipment before its sale in the open market.

To compensate for the removal of time priorities, the OSP will set aside as a reserve for disposal to government bodies a part of all property declared surplus. Such reserve will be offered to agencies which have filed lists of desired equipment with the regional OSP offices. The size of this reserve is to be based on the lists of requirements previously filed with OSP. Sales will be made to governmental agencies by direct negotiation, the sale price having been determined by OSP. A short period for reply is allowed after notification of availability.

New Sales Representative For Columbia Chemical Div

The appointment of R. M. Simpson as sales representative for its Chicago territory has been announced by the Columbia Chemical Division, Pittsburgh Plate Glass Co., Pittsburgh, Pa. He will represent the firm in the sale of alkalies, liquid chlorine, and related industrial chemicals, from the Chicago office, 1721 Tribune Tower.

First OF A Great *New* "CATERPILLAR" Line!

"Caterpillar" Bulldozers are here—first in a mighty line of earthmoving equipment designed, built and backed by the same manufacturer that makes the tractors which power it; sold and serviced by a single dealer; developed to bring you still greater advantages in getting "lowest costs on earth."

Forty years of "Caterpillar" earthmoving experience has gone into these complete-package bulldozers built to give perfect balance between power, traction and blade capacity; to include every design feature learned on the toughest tasks of war and peace; to insure one high standard of material and workmanship and to provide the top performance and long life which are tradition with "Caterpillar" products.

Proved in laboratory, on test field, and on the world's toughe jobs, "Caterpillar" Bulldozers are now ready to prove their adva tages, stamina and long life on *your* jobs.

Your "Caterpillar" dealer will gladly give you full informati on these rugged earthmovers. Better still, he will help you get the at the earliest possible date. Now, more than ever before, he is good man to know. See him soon.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINO

Mass. Plans to Begin Road Program in Spring

Although the end of the war found the Massachusetts Department of Public Works prepared with plans for a much needed highway program, the real start of construction will not be made until next spring, according to a recent statement by Commissioner Herman A. MacDonald. The first project will be on Route 2, connecting Concord with Fitchburg, Leominster, Gardner, and Westminster, in accordance with plans to schedule first the completion of gaps in existing highways. Other important routes will follow in rapid succession.

Commissioner MacDonald stated that the Department can do about $25,000,000 worth of highway construction per year. At present, it is a question of securing sufficient man-power, not equipment, he added.

Hydraulic-Press Catalog

The Rodgers portable hydraulic press is featured in a 16-page catalog just issued by Rodgers Hydraulic, Inc., 7415 Walker St., St. Louis Park, Minneapolis 16, Minn. Specifications, capacities, and other details of this portable universal hydraulic press are given, with illustrations showing its versatility and adaptability to almost any heavy-duty pulling or pressing problems, such as gears, pinions, bushings, etc. Other Rodgers equipment described includes shop presses, hooks and lugs for pulling, jacks, power-operated hydraulic pump units, and pipe-straightening devices.

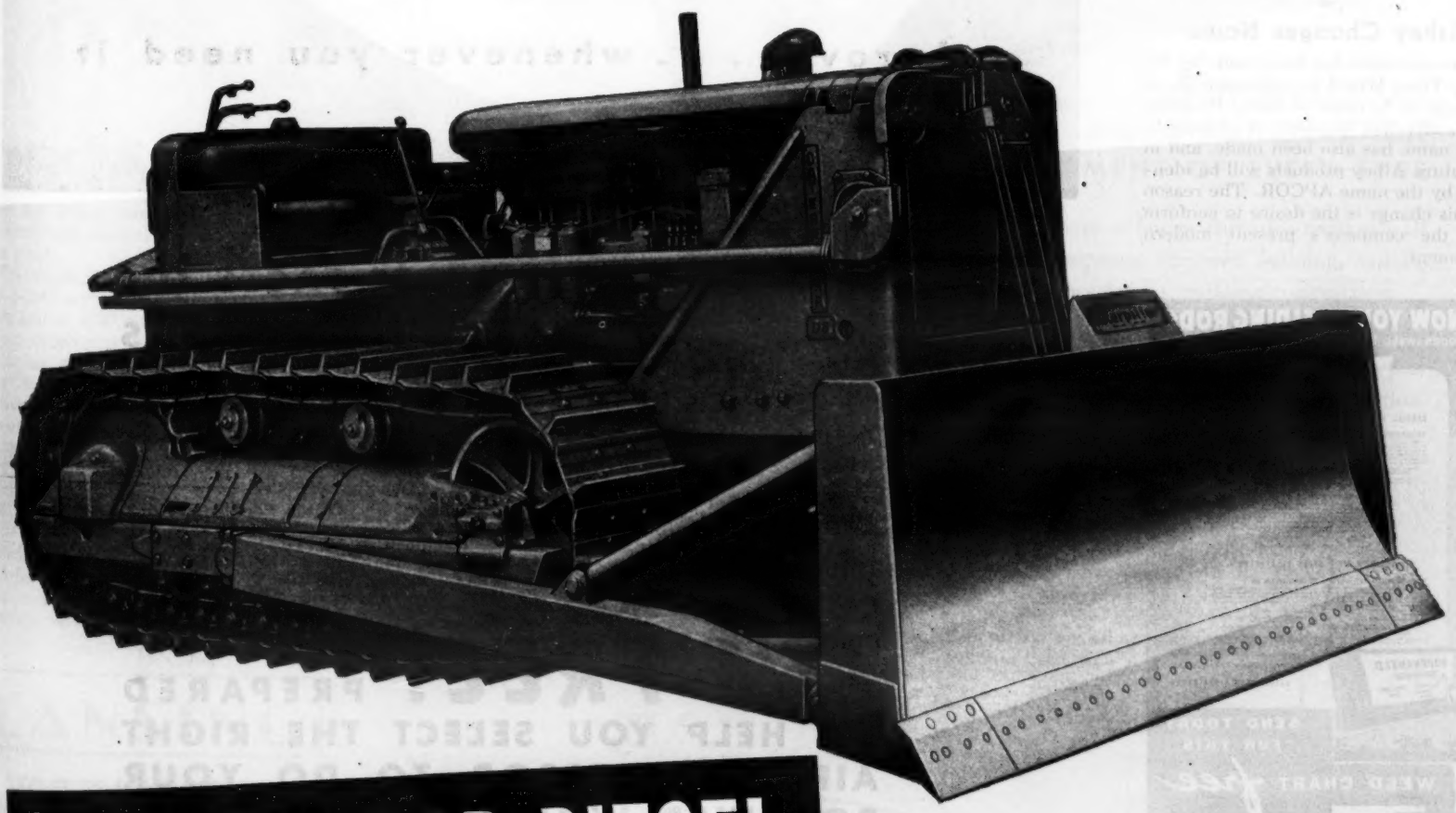
Copies of this new catalog may be secured by contractors and state and county equipment engineers direct from the manufacturer. Just mention this review.

Southern Officials To Meet in Atlanta

With the removal of restrictions on the holding of conventions, the Board of Directors of the Southeastern Association of State Highway Officials has announced that it will hold its 1945 convention at the Atlanta Biltmore Hotel, Atlanta, Ga., on December 3 and 4. The program is in charge of a large committee, with George T. McDonald, State Highway Engineer of Georgia, as Chairman. Ernest L. Bailey, Chairman of the West Virginia State Road Commission, is President of the Association.

BULLDOZERS WITH THESE OUTSTANDING ADVANTAGES:

- BALANCED DESIGN
- GREAT CAPACITY
- RIGID CONSTRUCTION
- REINFORCED BLADE
- EASY DIGGING
- ENCLOSED OPERATING CABLES
- LONG-LIFE CUTTING EDGES
- EASY BLADE ADJUSTMENTS
- QUICK MOUNTING
- UNIT MANUFACTURE
- ONE SERVICE SOURCE
- CORRECTLY GROOVED SHEAVES
- LONG CABLE LIFE
- SAFE OPERATION
- FINE VISIBILITY
- HIGH LIFT
- LOW DROP
- STRAIGHT OR ANGLING CUT



CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

The O'Connor Construction Co. used Cecure curing compound and applicator on a concrete paving job near Bloomington, Ill.

Compound Applicator For Concrete Curing

An applicator for Cecure membrane concrete-curing compound has been developed by the Ceco Steel Products Corp., 5701 W. 26th St., Chicago 50, Ill., and is furnished to contractors using Ceco road-building materials. It consists of a row of nozzles on a box mounfed on a bridge which rolls along the road forms. The curing compound is fed through the nozzles from a large tank or from a drum by a compressor mounted on the bridge framework. This device is designed to make a positive and uniform application of Cecure in one operation, and is said to complete the task of spraying the compound twenty times faster than hand methods.

Further information on the features of Cecure compound and the availability of the applicator may be secured direct from the company.

Athey Changes Name

Announcement has been made by the Athey Truss Wheel Co., Chicago, Ill., of a change in its name to Athey Products Corp., effective at once. A change in trade name has also been made, and in the future Athey products will be identified by the name APCOR. The reason for this change is the desire to conform with the company's present modern equipment.

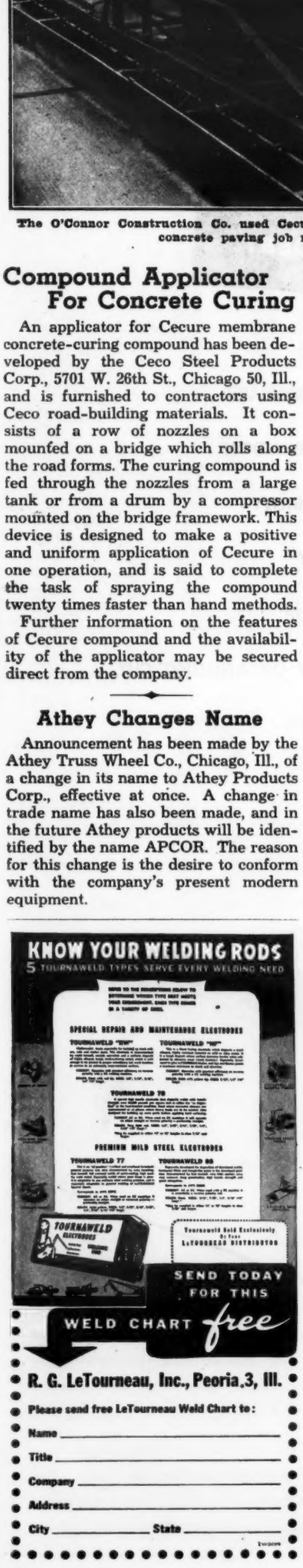
Athey Truss Wheel Co. began manufacturing track-type wheels and trailer units in 1922 for use in the earth-moving, logging, oil-field, and sugar-cane industries. The truss-type design featuring its early units was made obsolete by the Forged-Trak style of wheel which is current on modern Athey models. Also, the Athey line has greatly expanded during the past decade and now includes highway-maintenance and tractor-mounted loaders and high-speed rubber-tired heavy-duty trailers in addition to Forged-Trak wheel, trailer, and wagon units.

The products of the Athey company, which retains its location at 5631 W. 65th St., Chicago 38, Ill., are sold through the world-wide Caterpillar distributor organization.

Frank Wyse Dies

Publicity Manager for the Bucyrus-Erie Co., South Milwaukee, Wis., for 19 years, Francis O. Wyse died September 15 in Milwaukee, following a long illness. A native of Salem, Mass., Mr. Wyse was graduated from Massachusetts Institute of Technology as a mechanical engineer in 1919. In 1924 he left the Blanchard Machine Co., Cambridge, Mass., to join Bucyrus-Erie, for whom he became Publicity Manager in 1926.

Mr. Wyse was a Director of the Manufacturers' Division of the National Crushed Stone Association from 1934 until his death, serving as Chairman of the Board in 1934. In 1934 and 1935 he was one of three representatives of the Division on the National Directorate. He also served the American Road Builders' Association as Chairman of the Publicity Committee during 1938-39. In 1937 Mr. Wyse was elected President of the National Industrial Advertisers Association, having served as Secretary-Treasurer, and Vice President. He was President of the Milwaukee Association of Industrial Advertisers in 1932-33, and in 1942 became Secretary-Treasurer of the Milwaukee Post, Army Ordnance Association.


KNOW YOUR WELDING RODS
5 TOURNAWELD TYPES SERVE EVERY WELDING NEED
SPECIAL REPAIR AND MAINTENANCE ELECTRODES
PREMIUM MILD STEEL ELECTRODES
TOURNAWELD
SEND TODAY FOR THIS
WELD CHART free

R. G. LeTourneau, Inc., Peoria 3, Ill.

Please send free LeTourneau Weld Chart to:

Name _____

Title _____

Company _____

Address _____

City _____ State _____

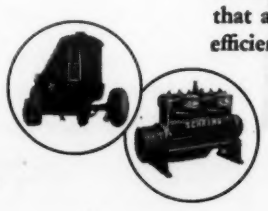
GET THESE FACTS ON AIR COMPRESSORS IN THE *new* SCHRAMM CATALOG

PARTIAL CONTENTS

Two Wheel Trailers . . Four Wheel Trailers . . Skid Mountings . . Streamlined Tool Boxes . . Live Hose reels . . Crawlers . . Railcars . . Electric Motor Driven Portable . . Motor Truck Mounting . . Belt Drive Stationary . . Built-in Motor Drive Stationary . . and many many more.

IT'S FREE! PREPARED TO HELP YOU SELECT THE RIGHT AIR COMPRESSOR TO DO YOUR POST-WAR WORK!

Up-to-the minute information on Schramm Air Compressors . . . and the information will be most helpful now that all industry is in a peace era in which work is being done the easiest, most efficient, and economical way. Write for your free copy without delay.



SCHRAMM INC. THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA

Dual Roadway Built To Atomic-Bomb Plant

Median Strip Paved With Black Concrete; Contractor Broke In Green Crew on Strip; Good Progress

HEAVY traffic required the dualizing of U. S. 25W, serving the Clinton Engineering Works near Knoxville, Tenn., one of the plants producing the atomic bomb, but the labor situation was bad. Although the War Manpower Commission had authorized employing seventy-five men for the project, the most the contractor could get when he started in the autumn of 1944 was forty-five. Even with this inadequate crew he averaged 900 to 1,000 feet of 22-foot concrete a 10-hour day whenever he was able to get enough aggregate for his pour. Over the winter sufficient sand and gravel were obtained to form a respectable stockpile so that the resumption of work would not be delayed for lack of material. The hiring of labor was another story, however, and a crew of thirty was the largest that could be secured. To organize and break in his force, the contractor began his spring operations with the paving of the median strip between the existing road and the new road built last autumn. In the late spring he hired an additional thirty men and continued the full-width paving.

Work was resumed in the spring on the second roadway to complete the remainder of the 7.4 miles of 22-foot paving which was nearly half finished last autumn. The road was built by the Foster & Creighton Co. of Nashville, Tenn., under contract with the Tennessee Department of Highways which received permission from the War Production Board to add this second roadway because of the heavy traffic between Knoxville and the large Clinton plant. During peak production this plant employed between 60,000 and 70,000 workers, most of whom drove back and forth to work over this road. This project, part of Tenn. 9, extended from the city limits of Knoxville to the Anderson County line. A second contract 6.8 miles long was let later to continue this second roadway on to the war plant.

The existing concrete road had an 8-6-8-inch section of 20-foot plain concrete laid in 1930, while the new road is 2 feet wider and has a uniform 8-inch thickness of plain concrete. No steel was used, not even for dowels in the dummy or expansion joints. The two pavements are separated along the greater part of the highway by a 31-foot parkway down the center, but in several locations where the cut or fill was particularly heavy, savings were made in the amount of earth work by reducing the width between roadways to 5 feet. At such places this median strip is paved with 8 inches of plain concrete, with the top 2 inches colored black in an effort to keep traffic from crossing over to the opposing lane. As the two roadways diverge again, in about a 200-foot transition, to the 31-foot unpaved center strip, the concrete median strip is widened only to 8 feet. A little over 2 miles of paved median strip was included in this contract, while numerous concrete crossovers connect the two roadways where they are separated by the parkway.

C. & E. M. Photo

A Koehring 34-E paver lays plain-concrete median strip on a contract to dualize the highway leading to the atomic-bomb plant near Knoxville, Tenn.

Grading the Road

Grading for the road was done in the summer of 1944 by the Oman Construction Co. of Nashville, Tenn., which used a fleet of ten Caterpillar DW rubber-tired tractors pulling LeTourneau 10-yard scrapers, ten Caterpillar D8 tractors pulling LeTourneau 14 to 20-yard scrapers, and six bottom-dump Euclids of 14-yard capacity. A total of 263,018 cubic yards of excavation was moved with this equipment, including 30,000 yards of earth borrow hauled 3,000 feet from borrow pits.

In one low swampy area the grade of the road was raised, necessitating the removal of 1,000 feet of the existing pavement, while at another location, where alignment was improved by crossing the new road over the old, 1,600 feet of existing pavement was torn

(Continued on next page)

LANSING

WHEELBARROWS
CONCRETE MIXERS
DRAG SCRAPERS

Lansing Company
LANSING, MICH.
SINCE 1861

TERMS ARRANGED TO SUIT THE NEEDS OF YOUR BUSINESS

WE FINANCE THE PURCHASE OF CONSTRUCTION EQUIPMENT OF EVERY TYPE

CONTRACTORS: When you buy construction machinery and equipment — LET C. I. T. FINANCE THE TRANSACTION.

Conserve working capital . . . let equipment help pay for itself out of earning capacity . . . amortize the cost while you are completing your contracts. OUR CONSTRUCTION EQUIPMENT PLAN provides money to buy machinery — engines — all types of equipment for road building, sewers, earthworks, waterways, building construction.

The offices listed will arrange all details or, tell the distributor from whom you make your purchase that you want C.I.T. to finance the transaction.

HERE ARE THE HIGHLIGHTS OF THIS EASY-TO-ARRANGE PLAN

- Cash, with which to purchase all types of machinery and equipment
- Ample terms of repayment arranged to suit the needs of your business
- Combine several purchases, if you wish, in one complete package
- No maximum or minimum required; we finance any amount
- LOW COST: comparable with the lowest rate available
- Prompt action; all negotiations conducted without "red tape"

The Mark of LEADERSHIP
C.I.T. CORPORATION
INDUSTRIAL FINANCING

OFFICES:
ONE PARK AVENUE,
NEW YORK 16, N. Y.
333 N. Michigan Avenue
CHICAGO 1, ILL.
660 Market Street
SAN FRANCISCO 4, CALIF.
In Canada:
CANADIAN ACCEPTANCE CORPORATION *Limited*
Metropolitan Building, Toronto

AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED

Dual Roadway Built To Atomic-Bomb Plant

(*Continued from preceding page*)

up. The pavement was first broken up by a skull-cracker mounted on a crane, followed by scarifying, after which the broken concrete was removed by the scraper units. Some of the concrete rubble was used in stone embankments for about 600 feet along a channel change and in another 700-foot embankment while the rest was wasted in some low areas along the road.

Paving was started by Foster & Creighton in the middle of October, 1944, and continued until the latter part of November when cold weather closed the job after 3½ miles of pavement was laid.

Installation of Joints

Grading for the median strip was done by hand labor and by a grader with a special blade and was a smoothing-over process for the most part. No expansion joints were placed along the sides of the pavement, but expansion and dummy contraction joints in the pavement were matched in the median strip. These transverse expansion joints, both in the full-width pavement and in the median strip, are Servicised pre-formed fiber joints, ¾ inch thick and 7½ inches high, so that the top of the joint is ½ inch below the level of the pavement. In the pavement two pieces 11 feet long were used, held in place with a special steel-frame holder which was removed after the concrete was spread and before the finishing machine went over the pour. In the median strip the joint was supported by an 8-inch wooden board held by three form pins which were removed, together with the board, after the concrete had been deposited around the joint. Expansion joints are 160 feet apart while the contraction joints are at 20-foot spacing.

Three men of the concreting crew installed these expansion joints, while three finishers looked after the placing of the contraction joints which were formed by forcing a piece of strap iron, ⅜ inch wide x 2½ inches deep, into the concrete just after it had been screeded. The strap iron was worked down into the concrete so that its top was about ½ inch below the surface, and was removed before the concrete hardened around it, leaving a slot which was edged by the finishers and later poured with an asphalt filler.

Batching Plant

The batching plant was located 1½ miles north of the road and about 3 miles east of the west end of the job near Powell, on the Southern Railway. The contractor built 650 feet of railroad siding into his plant, in addition to the track already there, so that there was accommodation for twenty-three railroad cars. Sand and gravel were fed to the batch trucks from a 2-compartment 105-ton Johnson aggregate bin and weighed on a Johnson beam scale. The bin was loaded by a Bucyrus-Erie 33-B crane with a 45-foot boom and a Williams 1½-yard clamshell bucket.

The sand and gravel were purchased from the Knoxville Sand & Gravel Co., produced at its plant at Knoxville, and brought by rail 12 miles to the siding. The sand was unloaded by the clamshell and stockpiled nearby, but for the gravel the contractor used a system whereby he could unload a car in 15 minutes without putting a bucket in the car. A point was selected under the rails and a pit dug about 6 feet deep and 12 feet wide with backslopes on a 45-degree angle. The railroad ties were removed and two mud sills built at each end of the pit below the rails. Two 15-inch H-beams, 16 feet long, were then placed between the mud sills to support the rails. When a gravel car was to be unloaded, it was spotted so that the hopper was directly over the pit, the hopper knocked open, and the gravel flowed into the hole dug to receive it. The clamshell then picked up gravel from this pit which kept filling up until the car was entirely empty. No hand labor was required in this operation; the only workmen were the crane operator and the operator of a Caterpillar Fifty tractor which switched the cars about on the siding by means of a long cable. Two men were used in cleaning up the sand cars after they were unloaded by the clamshell.

Portland cement was purchased in bulk from the Hermitage Portland Cement Co. at Nashville, brought 200 miles to the plant, and unloaded from the bottom of the railroad cars into a trough between the tracks. A canvas hood was placed around the hopper so that cement would not be lost by blowing away during the unloading. A screw pulled the cement through this trough to the side of the track where it was raised in a 40-foot enclosed elevator to a Johnson 375-barrel bin. The screw and elevator were operated by a Ford V-8 engine.

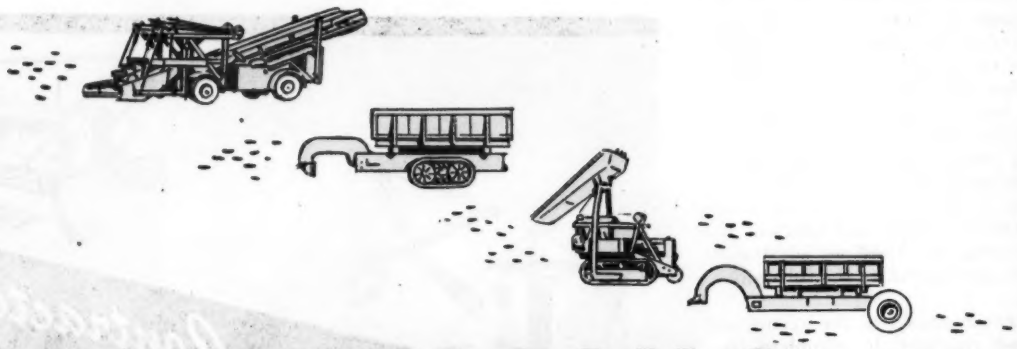
During the pouring of the median strip, five Ford 1½-ton trucks, each carrying two batches, were used; the contractor increased this number to twenty when the full-width paving started. Sand and gravel were loaded into the truck simultaneously from the batcher, with the sand, a little slower in discharging, going on top. A laborer shoveled the sand back towards the tail-gate and the trucks drove about 750 feet to the cement plant, which was on their way to the job, picked up the cement, a tarpaulin attached to each truck was rolled over the batch, and the truck was on its way to the paver.

The dry weight of the 8-bag batch was as follows:

Cement	752 lbs.
Sand	1,696 lbs.
Gravel	2,736 lbs.

To this dry batch 48 gallons of water was added at the paver. This mix was designed to give a modulus of rupture of 650 pounds per square inch in 7 days.

(*Continued on next page*)



ANNOUNCING..

a change in name

Effective at once

ATHEY TRUSS WHEEL COMPANY

has adopted the name

ATHEY PRODUCTS CORPORATION

5631 W. 65th ST. CHICAGO 38, ILLINOIS

And its Forged-Trak Wheels, MobiLoaders Force-Feed Loaders and Rubber-Tired Trailers will bear the Trade-Mark

"APCOR"

National Carbide FLOOD LIGHTS Are

Simple in construction

Economical in cost

Dependable in operation

Available in 1,500, 8,000 and 16,000 candlepower units

Write for literature showing complete line of Floodlights and Lanterns

NC 200

NATIONAL CARBIDE CORPORATION

60 E. 42nd St. New York 17, N. Y.

C. & E. M. Photo
A track pit speeded the unloading of gravel at Foster & Creighton's batching plant for its 7.4-mile paving job.

Dual Roadway Built To Atomic-Bomb Plant

(Continued from preceding page)

and 750 pounds psi in 28 days. The gravel used as coarse aggregate was graded between ½ and 2-inch screen sizes, while the sand was between the ¼-inch and the No. 50 sieve.

Paving Operations

The lower 6 inches of the median strip is plain concrete while the upper 2 inches is colored black by adding black iron oxide to the batch in the skip of the paver. Three batches of regular concrete were deposited to a 6-inch depth and then 32 pounds of the black iron oxide was added to the fourth batch which was spread on top of the others. The coloring agent came in 50-pound sacks and was weighed out at the batch plant into paper bags holding 32 pounds, or 4 pounds to the bag of cement. These bags were carried along on the paver.

A Koehring 34-E dual-drum paver with a 40-foot boom was used in both pouring operations, running on the new pavement in pouring the median strip, with traffic moving as usual in both directions on the existing road. Batch trucks ran along the new road until within about 500 feet of the paver when they reversed their direction and backed to the skip to unload. A man with a wooden maul pounded the bottom of the truck bodies when they were in the "up" position to loosen cement clinging to the inside.

Water for concreting came from a spring located about mid-way of the job, and was pumped by a 4-inch Gorman-Rupp, powered by a Hercules 4-cylinder engine, into an 1,800-gallon water tank mounted on an International truck. A similar truck was always stationed at the mixer and had on the rear a Gorman-Rupp 2-inch pump, driven by a Wisconsin engine, which could transfer water from the transporting tank truck either directly into the water tank on the paver or, if that was filled, into the storage tank truck. This latter unit ran about 50 feet ahead of the paver and supplied water also for sprinkling the subgrade which was done the night preceding the day's concreting. This truck carried 200 feet of hose.

The concrete batch was mixed 40 seconds in the first drum and 35 seconds in the second drum, and operations were so timed that there were two batches always in the drums and one batch in the skip. The paver was equipped with a dual-gate bucket, and on the median strip three or four dumps from one batch helped to distribute the concrete, requiring less movement of the material by the puddlers. A portable Jackson vibrator on two rubber-tired wheels was used along the forms prior to the screeding which was done by hand with a 10-inch steel channel, 10 feet long, on which handles were mounted.

Three puddlers set the expansion joints and distributed the concrete, followed by two men with the screed, behind which came three men with long-handle 10-foot floats who smoothed the concrete transversely. Three finishers looked after the contraction joints and hand-floated the concrete from 300 to 400 feet behind the paver. They opened the concrete over the expansion joints, and edged all joints and the sides of the pavement with a ¼-inch-radius edging tool. When that was done, a 2-foot fiber broom was dragged transversely across the pavement to provide a grip for traction. This causes a peculiar sound when auto tires run over it, so that this and similar strips are known throughout the state as "whistling strips".

Ritecure, a membrane curing compound, was used on this job, being applied by a Briggs & Stratton gas-engine-driven 25-gallon compressed-air spraying machine operated by a three-man crew. An average of 1,800 feet of median strip was paved in a 10-hour day.

Full-Width Paving

As soon as the contractor had his organization running smoothly, he started work on the 22-foot concrete paving, using the same methods and

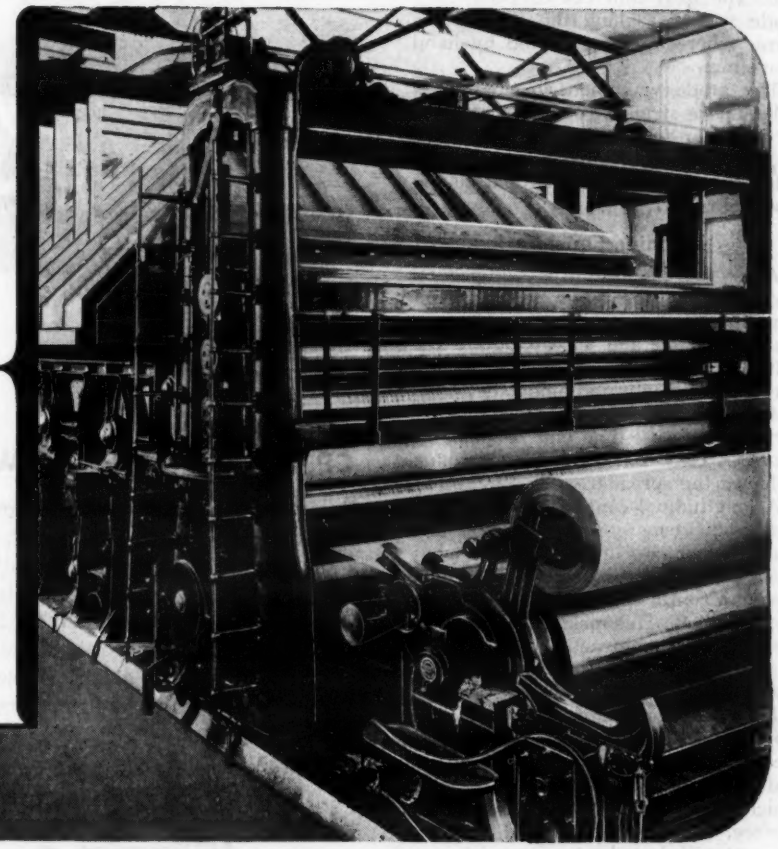
(Concluded on next page)

JUST fit the required base to the Union Hammer, turn it and this one-piece double-acting pile driver is prepared to perform its work! These easy-to-fit bases are supplied for all Union Hammers, for every type of pile driver service.

Write for booklet No. 184.

UNION IRON WORKS
INCORPORATED
Established 1900
ELIZABETH B NEW JERSEY

SINCLAIR has the Answers to Your Lubrication Problems



For Example:

WHERE OIL LEAKAGE is troublesome, SINCLAIR NO-DRIP LUBRICANT, Light, Medium and Heavy, is the remedy. No-Drips are highly efficient oils specially compounded to insure adhesive qualities. They resist throw and leakage from broken seals and worn bearings . . . are non-spattering on shafting, cams and other moving surfaces.

OLDEST CRUDES MAKE FINEST LUBRICANTS

Adhesive characteristics of NO-DRIP LUBRICANTS make them particularly suited to lubrication of hard-to-reach parts. They are also economical because fewer applications are required. Sinclair also provides BEARING GREASE AF for ball and roller bearings . . . OPALINE PRESSURE SYSTEM GREASE for plain bearings . . . and a complete line of steam cylinder, circulating system and general purpose oils.

SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

Dual Roadway Built To Atomic-Bomb Plant

(*Continued from preceding page*)

equipment that were employed last autumn. Two Caterpillar No. 12 power graders rough-graded the base to within about 0.1 foot of the finished grade, after which a Cleveland Formgrader dug the trench for the Heltzel standard steel forms. The contractor had about 8,000 feet of these forms on the job, of which 1,000 to 3,000 feet were strung out on each side of the road awaiting the final adjustments of line and grade. There was always a double row of forms at least 500 feet ahead of the paver on the fully prepared subgrade ready for the concrete which was poured the full 22-foot width. The contractor used a Jaeger form tamper to insure a firm bearing for the forms. A crew of twenty was used in setting forms and preparing the grade.

Further fine grading was done after the power graders by Ted Carr subgraders. Two of these machines were employed, one with its blades set for the 1½-inch crown used in the new slab design, and the other with a flat adjustment of the blades for use on curves. These machines rode on rollers on the forms, and were jacked up and supported by two large wheels at the center on which they were moved when the machines were interchanged to suit the road section where they were working. The final thin cut of earth they made was cast along the side of the forms where it was removed by hand shoveling.

The grade was then checked by a ruler and a string stretched across the forms, after which the sides and tops of the forms were oiled and the grade rolled by a Buffalo-Springfield 10-ton 3-wheel roller.

Machine Finishing

After the concrete was dumped on the grade by the paver a battery of equipment took over. The concrete was first struck off and spread out to the full 22-foot width by a Blaw-Knox spreader, and vibrated along the forms at the same time by two Jackson vibrators carried at either end of the machine. A Blaw-Knox finishing machine followed the spreader.

A longitudinal center joint was then put in the concrete by a Flex-Plane machine, which cut a slot 2½ inches deep with a wheel and fed into this groove a continuous bituminous ribbon ¼ inch thick. This machine also put in the transverse contraction joints every 20 feet in the same manner although the slot was cut by a saw-tooth device. A Koehring Longitudinal Finisher then worked back and forth across the surface, carrying a small surplus grout and covering the longitudinal joint which was installed ¼ inch below the surface. This joint is allowed to crack when it will, but the transverse joints, both expansion and contraction, were edged with a ¼-inch-radius tool and poured later with asphalt.

The surface was then given a final finish with an 8-inch rubber bow belt, pulled by two men, who were followed by a 4-wheel rolling bridge from which the finishers worked on the joints. The surface was then broomed with a fiber broom, after which a 4-inch black center traffic stripe was impressed by another Flex-Plane machine using magnetic oxide of iron for the coloring agent. The same system of membrane curing as used in the median-strip pour then followed. Ten-foot-wide shoulders of crushed stone 4 inches thick complete the roadway section.

Quantities and Personnel

The major estimated quantities included the following items:

C. & E. M. Photo

Bitecure membrane curing compound was used on both median strip and full-width paving on the Foster & Creighton contract near Knoxville, Tenn.

Excavation	263,018 cu. yds.
Crushed stone for shoulder material	15,775 cu. yds.
Cement-concrete pavement	114,711 sq. yds.
Concrete for structures	908 cu. yds.
Steel-bar reinforcement	80,522 lbs.
Concrete gutter	631 cu. yds.
Concrete pipe culverts, 15 to 30-inch	5,671 lin. ft.

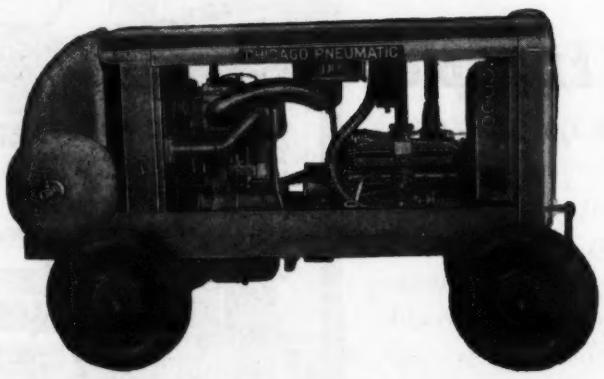
This project, which was awarded to the Foster & Creighton Co., general contractor of Nashville, Tenn., cost around $625,000, including the construction of two bridges at $67,000. A. A. Johnson was Superintendent for the contractor, and L. P. Hoge was Resident Engineer for the Tennessee Department of Highways of which C. W. Phillips is Commissioner and W. T. Brooks is State Highway Engineer. The work was done in the First Division of which G. W. Prater is Division Engineer and J. B. Hawley is Division Construction Engineer.

General Sales Director Named by Master Vibrator

Arthur T. Stanton, until recently Chief of Operations in the WPB's Production Facilities Bureau at Washington, has been named General Sales Director by the Master Vibrator Co., Dayton, Ohio, manufacturer of gas-electric generator plants, concrete vibrating equipment, electric power hammers, and other industrial products.

Together with its line of gas-electric generator plants and floodlights, a number of new products field-tested during the war are soon to be made available by this company to the marine, railroad, automotive, and other markets.

Use CP Equipment

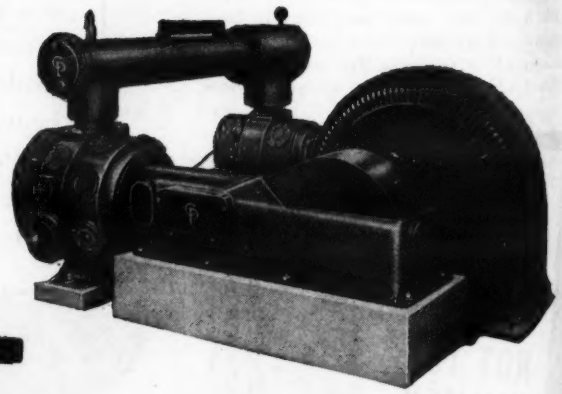


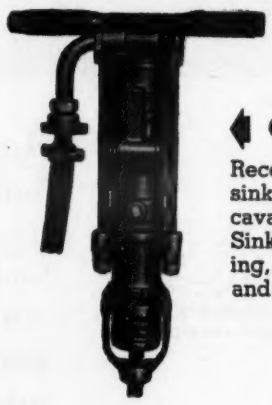
CP PORTABLE COMPRESSORS

You get 15% to 35% more air per gallon of fuel with CP Portable Compressors. Design refinements include: gradual speed regulation, Simplate Valves, pressure lubrication and self-adjusting clutch. Sturdy, economical CP Portable Air Compressors are available in gasoline-powered models of 60, 105, 160, 210 and 315 c.f.m.; and in Diesel-powered sizes of 105, 160, 210, 315 and 500 c.f.m.

CP STATIONARY COMPRESSORS

Designed to fulfill every requirement for heavy-duty, continuous service, the Chicago Pneumatic O-CE Motor-Driven Compressor, here illustrated, is sturdily built and conservatively rated. It is furnished in capacities up to 10,000 c.f.m. Other CP Stationary Compressors are supplied in vertical and horizontal designs for steam, belt and electric motor drive, in a wide variety of capacities and pressures.





CP-32 SINKER DRILL

Recommended for all types of shaft sinking, quarry drilling, general excavation and road work, the CP-32 Sinker Drill is noted for its fast drilling, its high speed, strong rotation and good hole cleaning qualities.

CP-7 PORTABLE SLUDGE PUMP

This high lift sludge pump with low air consumption operates on the injector principle. It handles up to 15% solids, preventing rapid wear on expensive replacement parts when water contains sand or rock drill cuttings.

CP 365-RP PNEUMATIC WRENCH

This fast powerful Impact Type CP Wrench applies or removes nuts, bolts, lag screws and studs in a fraction of the time it takes to do the job by hand. Capacity: 1¼" bolt size. CP 365-RP is one of 6 time-saving CP Pneumatic Wrenches, handling bolts, nuts, etc. from ⅜" to 1¾" bolt size.

Heavy-Duty Rollers First of 1946 Line

Rugged 10 and 12-ton three-wheel road rollers, until now manufactured exclusively for the Navy, have been made available to the civilian market by the Buffalo-Springfield Roller Co., Springfield, Ohio, as the first of a completely new line of 1946 models.

Among the features of the new rollers is a four-speed transmission which provides a wide selection of speeds without the use of throttle control. This transmission and the bevel gear differential are enclosed in one housing bolted to the engine to form a unit which is installed as a complete assembly in the roller. This assembly includes radiator, fan, and final drive pinions, besides the transmission, differential, and engine, and is so arranged that each component may be serviced individually without removal from the frame.

Other features of the new Buffalo-Springfield rollers are an enclosed front-end and top-air intake for a cleaner engine compartment and more efficient cooling system; readily accessible clutches; heavy reinforced all-welded steel-channel frame; low-pressure hydraulic steering for effortless and instantaneous operator control; roomy operator's station with all control within easy reach; heavy-duty bearings throughout; and simplified differential lock. All rolls are cast from special-analysis alloy iron said to provide long wear without glazing. Power is furnished by a heavy-duty 6-cylinder gasoline or diesel engine, specifically selected for road-roller service.

The first of Buffalo-Springfield's 1946 models is this 10 to 12-ton three-wheel roller.

Interested contractors and state and county highway engineers may secure further information on this new 1946 heavy-duty roller direct from the manufacturer. Just mention this item.

Michigan Bridge Engineer

George M. Foster, East Lansing, has been appointed Bridge Engineer of the Michigan State Highway Department, succeeding the late James H. Flynn. Employed by the Department in various posts, and as consultant at times during the past 20 years, Mr. Foster has also been consulting engineer to various county and municipal road commissions. He designed a number of the structures on the recently completed Detroit Industrial-Willow Run Expressway.

to . . .

SPEED WORK
SAVE LABOR
CUT COSTS!

For almost 50 years, efficient CP Air Compressors, Rock Drills, Backfill Tampers, Wagon Drills and Pneumatic Tools have set the pace in day-after-day dependable performance — and are equally noted for their low maintenance cost. In the extensive CP line, you will find time and labor-saving equipment for every purpose — in sizes and capacities for all contracting needs. Write for copy of Catalog No. 600.

CP CLAY DIGGERS

For general digging in soft to medium hard clay, the lightweight CP-3 Clay Digger is unequalled in speed and ease of handling. For digging in hard clay, shale, etc., the CP-5 is recommended.

CP NO. 5 DIAMOND DRILL

Weighing only 160 pounds without rod puller, this one-man diamond drill combines high drilling speeds, ease of handling with maximum core recovery and low cost per foot drilled. Working in any standard saddle, in any position from a column, arm or crossbar, the CP No. 5 Diamond Drill, with EX fittings, has 500-ft. capacity. Also widely used for blasthole drilling.

CP-60N MOTORdrifter

To do a fast, low cost drilling job in hard, seamy or ravelly formations, or tunneling from Jumbo drill carriages, no drifter is better than the 3½" CP-60N MOTORdrifter. It materially speeds drilling cycle, lessens operator fatigue, reduces overall time and expense, and avoids accident risk.

★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

Expressway Grading A Million-Yard Job

(*Continued from page* 1)

would be wiped out in the new construction must be taken care of. At present there is a severe housing shortage in Cleveland.

The next portion of the project will be the Newburgh Freeway, work on which will start at the downtown or northerly end, working south to connect with the Willow Freeway. Completion of the plans for this section is awaiting the consent of the City Council on the center line of the location.

In order to speed the most essential parts of this $250,000,000 project, a "primary urgency program" was set up, eliminating the outer belt which reduces the cost to $133,000,000 and also excluding the University Freeway. At present, the bottleneck as far as plans are concerned is the design of hundreds of grade-separation structures. It is planned to farm out the bridge plans to private engineering organizations to speed the work.

Although the section of the Willow Freeway now under construction is not the most essential part as regards traffic relief, public opinion demanded that it be constructed soon after the State had spent $750,000 on an elaborate interchange between Ohio 17 and U. S. 21 at the south end of the Willow Freeway.

It is interesting to note that the sum of $250,000,000, the approximate cost of this greatly needed traffic-relief project of freeways, was spent by various public relief agencies in Cleveland on "made" work during the depression. If that sum had been expended on this express-highway project, an equal amount of employment would have been created and the Cleveland metropolitan area would now have its needed traffic facilities.

Design of Present Work

The first section of the Willow Freeway, now under construction, is 8,776 feet long and will carry U. S. 21 on new location from the Cuyahoga River, where it connects with an already completed section of U. S. 21, to the new Newburgh Freeway and thence to downtown Cleveland. This section will eventually be paved with two 36-foot concrete highways separated by a 9-foot median strip with a 5-inch curb on either side, and shoulders, or berms, 12 feet wide and carried 2½ feet beyond any guard-rail installations.

The present contract includes a $300,000 railroad bridge, the construction of which has been held up because of the shortage of steel. There is also another bridge at Grant Avenue about 1,200 feet from the north end of the contract, with approach ramps up either side.

The maximum curve in the 1.66-mile contract is 1 degree 30 minutes.

Heavy Excavation Wasted

The heavy excavation in the 1,700 feet north of the railroad bridge, the distance between the railroad and Grant Avenue bridges, created a considerable problem for the contractor. It was planned to haul this excavation under the new bridge to the large fills south of the structure, but when this became impossible because the bridge could not be built, it would have required a 2½-mile haul instead of the maximum 3,000-foot haul to the fill. To overcome this, the contractor, with the permission of the State Department of Highways and the Public Roads Administration, arranged to waste 390,000 cubic yards of excavation.

About 260,000 cubic yards of this was sold by the contractor to adjacent industrial plants to fill in low areas, and the contractor replaced this material by

(*Continued on next page*)

Expressway Grading A Million-Yard Job

(*Continued from preceding page*)

borrow of equal or better grade at no added cost to the State. The specifications require that all borrow must contain less than 50 per cent silt which is the critical element in the borrow as regards its value for fill.

Excavation was continued during the winter and the material wasted. On this section the contractor carried the work down to within 10 feet of the bottom of the cut and then excavated a sewer trench down the center line of the highway with a clamshell. Sewer pipe varying from 12 to 30 inches in diameter was then installed, and the trench backfilled with 1-inch and smaller granulated slag. This dried up the cut quickly and made the balance of the excavation much easier. The excavation in this section was done by a Northwest 1¼-yard and a Lorain 1¼-yard shovel with five trucks working under each. The average haul was about 1,000 feet to the fill areas at the industrial plants.

Borrow Areas Developed

Four borrow areas with acceptable material were leased by the contractor to furnish the regular fill as well as the material to replace that wasted from excavation north of the railroad-bridge site. The first of these borrow areas will provide a total of 350,000 cubic yards with an average haul of 2,000 feet. It is located just west of the center of the project. The second area, at the south end of the contract, on the east side, is furnishing 150,000 cubic yards with an average haul of 750 feet and a maximum haul of 1,200 feet. The third borrow area will produce 200,000 cubic yards, is also located on the east side of the contract near the south end, and permits an average haul of about 600 feet and a maximum of 1,000 feet. The fourth borrow area was used only for 50,000 cubic yards with an average haul of 600 feet.

C. & E. M. Photo

The car at the right is on a fill on the Willow Freeway which is to be 47 feet higher than shown. In the foreground is borrow pit No. 2, with pit No. 4 on the other side of the right-of-way.

The short hauls from all of the borrow areas are made by a 16 and a 22-yard LeTourneau Carryall pulled by D8 tractors, owned by the contractor, and for about two months the contractor rented a 16 and an 18-yard Carryall to speed up the work. The longer hauls are made by Koehring Wheelers of which the contractor uses two 12-yard and five 9-yard units. Shovels were used only in the cut where the excavation was wasted; and the Koehring Wheelers removed some 60,000 cubic yards of material which was wasted in addition to the 200,000 cubic yards excavated by the shovels.

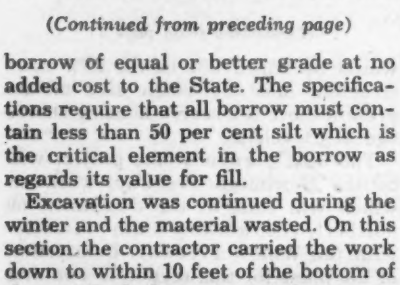
The borrow pits are broken up by a John Deere No. 66 gang plow pulled by a hybrid tractor known as "The Jeep" on the job. The use of the plow slows up the loading slightly, but makes the material usable at an earlier date as it permits aeration and consequent drying of the material to below optimum moisture. The same plow is also used for mixing material on the fills.

Additional tractor equipment on the job includes two Allis-Chalmers HD-14 tractors, a Model K, a Model L, and two Caterpillar RD8's and one RD7 as pushers. The Allis-Chalmers tractors are equipped with Euclid and Baker bulldozers.

Placing High Fills

Before any work began on this contract, it was determined by laboratory experiments as well as field work by soils engineers of the Ohio Department of Highways that the material to be

(*Continued on next page*)



Junior RAPID PAVEMENT CONCRETE BREAKER

Fastest Pneumatic Method
Cuts Cost and Time
Works Inside or Out
Good for all Small Jobs

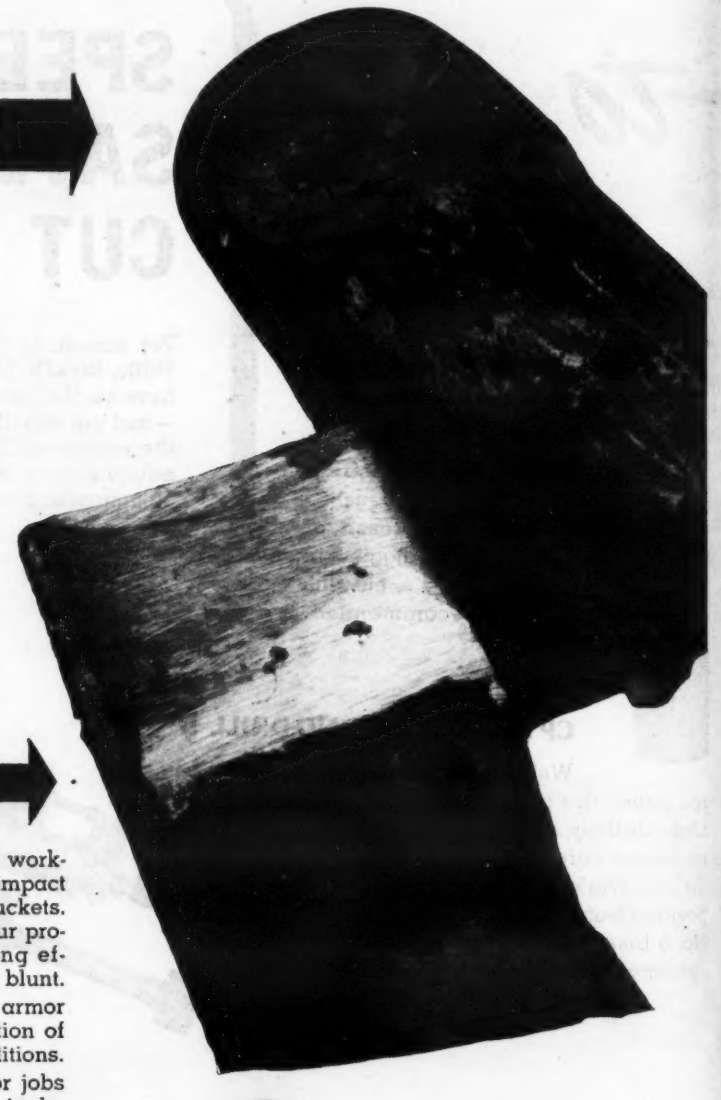
Ask about our
HEAVY-DUTY TYPE

RAPID PAVEMENT BREAKER COMPANY
1517 Santa Fe Avenue, Los Angeles 21, Calif.

Blunt➡ isn't it?...

but MIR-O-COL Hard-Facing will rebuild your Bucket-Teeth

Sharp like this ➡



➡ When your excavating equipment is working in heavy granite or shale and sand, impact and abrasion grinds teeth and lips of buckets. This wear is one of the costly losses on your production chart, because material handling efficiency of the bucket drops as teeth wear blunt.

MIR-O-COL metal rods are specified as an armor of hard alloy applied over a built-up section of either mild steel or an insert in such conditions.

Hard-Facing rod No. 1 is recommended for jobs where a thin overlay of extreme hardness is desired to protect against excessive abrasion. Hard-Facing rod No. 2 is an all-purpose type for use where severe impact as well as abrasive conditions will be met.

MIR-O-COL Hard-Facing can be applied by either oxy-acetylene or electric arc methods. These hard-facing materials cost only a small portion of the price of new teeth, and—in addition—provide plus advantages of reduced maintenance time and improved operating efficiency of equipment at work. Stocked now by supply houses in most construction centers, MIR-O-COL Hard-Facing metals are easy to buy. Experience proves they are easy to apply. See your welding supply company or write to MIR-O-COL.

SEND FOR YOUR FREE COPY

To learn more about the application of MIR-O-COL Alloy Company hard-facing rods, write to your local welding supply jobber or direct to the company, attention Department B-16. We will send you a copy of "Weldors' Guide to Successful Hard-Facing."

MIR-O-COL
HARD-FACING RODS
ALLOY COMPANY
2416-60 EAST 53RD STREET, LOS ANGELES 11, CALIFORNIA

MAIN OFFICE
2416-60 East 53rd Street,
Los Angeles 11,
California

EXPORT OFFICE
American Steel Export Co., Inc.
347 Madison Ave., New York 17, N. Y.
448 S. Hill St., Los Angeles 13, Calif.

pressway Grading A Million-Yard Job

(Continued from preceding page)

d in the fills would compact best at ghtly below optimum moisture which erages about 14 per cent. Consequently, the specifications require that fill material be aerated to slightly low optimum moisture before being mpacted in the fill. The material actually placed and compacted varies om a very small fraction under optium moisture down to, but not more an, 2 per cent below optimum moisre. Moisture tests are not run on the b during the placing of the fill as the octor cylinder gives quick and acrate check results.

Beneath all fills a 4-foot blanket urse of granulated slag was placed so at any water pressed out of the round would rise into the slag and run f. It is anticipated that the maximum ttlement on the fills will be about 3 et. The slag blanket course was wet y a sprinkler wagon to aid compaction. Vater for this purpose was secured om an outfall sewer at the adjacent outherly Sewage Treatment Plant of he City of Cleveland. A small gasngine-driven pump filled a 1,000-galn tank from which the sprinkler agon drew its supply.

The largest fill on the Lombardo conact is located about 1,000 feet south of he railroad bridge. It is 425 feet wide at e base, toe to toe, and 64 feet high. he highest fill is just to the north of is, reaching 67 feet. The specifications equire the placing of all of the material n 8-inch loose layers which when eady are rolled to the required Proctor ensity which varies with the weight of e soil.

Loads of blue clay and granular maerial are windrowed along the fill, nocked down by two Galion 101 power raders, and then mixed by a Killefer 3 road-mixer. This machine consists f four rows of disks placed diagonally, ith the disks spaced 2 inches apart. ecause the clay stuck between the isks, the contractor removed alternate airs and secures excellent mixing of e clay and granular material.

The Killefer disk machine as well as ther equipment is pulled by "The eep". This powerful and reasonably peedy vehicle consists of an Allis-halmers Model K tractor from which ll of the crawler equipment was reoved and replaced by four wheels. On e rear wheels 18.0-24 tires were inalled and on the front wheels, 9.00-24 res. This makes it possible to drive the achine over all kinds of surfaces and a higher speed than when it was quipped with the crawlers.

The 8-inch loose layers of fill, after isk and blade mixing, are compacted y sheepsfoot rollers which drag a pair H-beams behind them to fill the holes ft by the feet of the roller on the early

C. & E. M. Photo

One of the Koehring Wheelers used by Lombardo Bros. on its Willow Freeway grading contract dumps its load going downhill.

trips. In all, there are six sheepsfoot rollers on the job, two LeTourneau and four others of various makes.

The contractor takes unusual care in maintaining the fill in a condition to drain readily in wet weather, of which there was an inordinate amount in 1945, and in leaving the fill in a neat workmanlike condition every night. During a long wet spell when the fill was about 200 feet wide it was kept 5 feet higher on one side with a practically uniform slope to the low side to permit ready drainage. At the end of the wet spell, the low side was brought up with 6-inch layers alternated with 6-inch layers across the entire fill.

Every night a "roof" is put on the fill by rolling it with a 5-foot 6-inch-diameter steel roller weighing about 3 tons. This roller, which is also used to compact the berms or shoulders, was acquired by the contractor from a defunct racetrack.

Production Data

Some of the production figures on this job when either two or three of the borrow pits were in operation are of interest. During the last two weeks of August, 1944, 50,431 cubic yards of borrow was placed in the fills while in the first two weeks of September the production was 39,462 cubic yards and in

(Continued on next page)

PRECISION AIRCRAFT ENGINE PARTS
COMMERCIAL HEAT TREATING
SEASONING OF STEEL
NITRIDING—A SPECIALTY

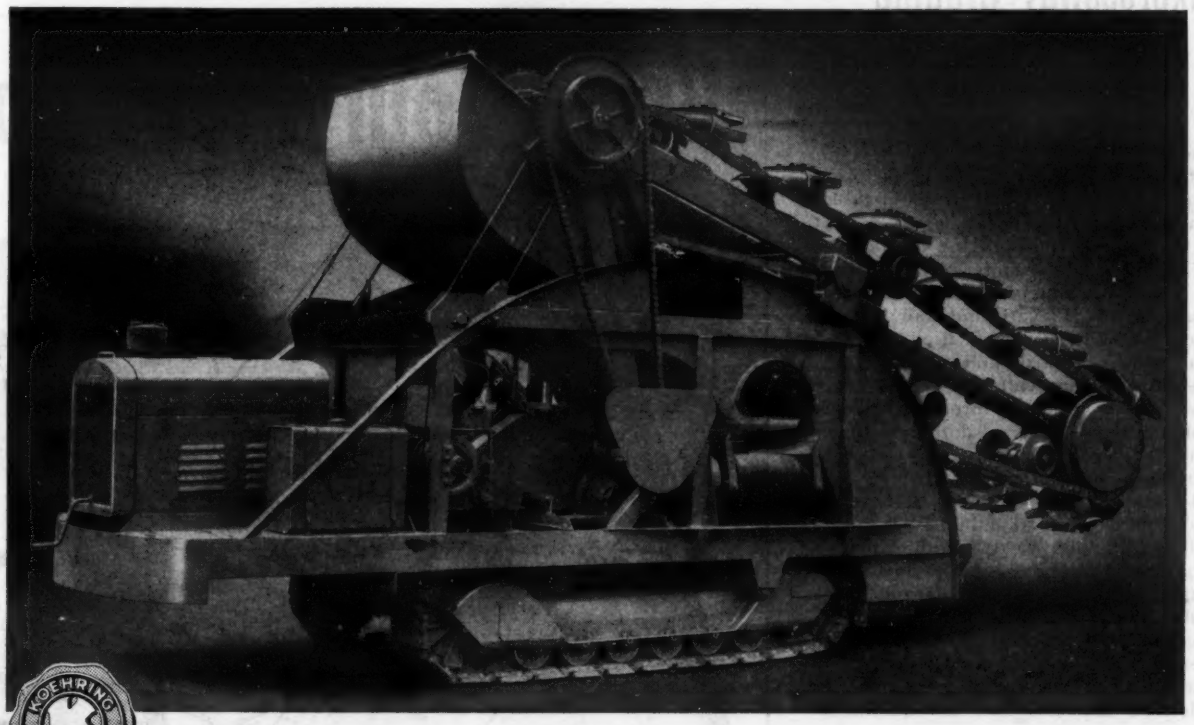
CADMIUM, ZINC, TIN and HARD CHROME PLATING

GRINDING

DESIGN—MANUFACTURE UNIVERSAL JOINTS

Metallurgical Laboratories
ENGINEERING DIVISION

AGERSTRAND CORPORATION
Muskegon, Michigan
Sales Office: 1402 Kales Bldg. Detroit 26, Mich.



KOEHRING PRODUCT

221 Announcing Parsons TRENCHLINER

TO complete its peacetime line of Trenchliners, the Parsons Company presents the Model 221. Its fields of application: All types of utility trenching, particularly in close quarters, and railroad drainage. Similar in design and construction to the well-known Parsons 250 Trenchliner, the Parsons 221 Trenchliner cuts trenches fast and easy, at low cost.

221 PERFORMANCE DATA:

Depth of Trench: Up to 8'
Digging Widths:

Buckets Only	16"	20"	24"
Special Teeth	22"	26"	30"
With Sidecutters	28"	32"	36"

Digging Speeds: 25—From 2" to 113" per minute
Traveling Speeds: 5—From ½ to 2¾ miles per hour

Digging through an old Iowa road surface at the rate of 3 feet per minute, trenching 24 inches wide, 5 feet deep. That's the type of performance you can expect from the Parsons 221 Trenchliner.

Ask for your Parsons 221 Trenchliner Catalog today.

THE PARSONS COMPANY
NEWTON, IOWA

TRENCHING EQUIPMENT
PARSONS

C. & E. M. Photo

Two styles of Armco bin-type retaining walls are used on the Willow Freeway above a paved drainage channel.

Expressway Grading A Million-Yard Job

(*Continued from preceding page*)

the last two weeks of September, with extra LeTourneaus working, the production was stepped up to 60,640 cubic yards.

On September 16, 1944, a total of 6,472 cubic yards of material was placed in the fill, working two 8-hour shifts. On that day two 12-yard and four 9-yard Koehring Wheelers were used, one 22-yard, two 18-yard, and one 16-yard LeTourneau Carryall, three bulldozers, two power graders, three sheepsfoot rollers, the Killefer disking machine, and "The Jeep". In computing the production, the State figured that 16 and 18-yard Carryalls actually deliver 12 cubic yards per load and a 22-yard unit delivers 16 cubic yards. On the Koehrings, both 9 and 12-cubic-yard machines, the payload was figured at 8 cubic yards. The 5-ton trucks used on that day were figured at 4 cubic yards per load. The grading crew consisted of the superintendent with 2 foremen, 2 oilers, 2 laborers, and 16 equipment operators.

Drainage and Other Pipes

Where a 6-inch water main is to be laid across the highway to serve the Southerly Sewage Treatment Plant, the grade will be carried to within 4 feet of top elevation and then a trench 2 feet deep dug for the main. After the main is laid, the trench will be backfilled. It was considered better to place the main near the top of the fill instead of at the bottom where a break might cause the complete washing out of a section of the fill before the water line could be shut off.

For the sewers and drains the contractor used a small Cleveland trencher and an Austin trencher. The plans called for concrete gutters at several points and these were poured by the contractor's own 2-yard Jaeger truck-mixers. Backfill around sewers was compacted by a pneumatic tamper operated by a 220-cfm Sullivan portable air compressor.

Major Quantities

The major quantities in the roadway section of the contract include the following:

Roadway excavation, unclassified	592,017 cu. yds.
Excavation for structures	2,000 cu. yds.
Water-granulated slag, Grade B	162,657 cu. yds.
Channel excavation	900 cu. yds.
Borrow	488,562 cu. yds.
Removal and disposal of trees and stumps	555
Water, estimated	4,408 M-gals.

In addition, there were a total of 19,536 feet of 12 to 36-inch vitrified-clay and plain and reinforced cement-concrete pipe for storm sewers and roadway drainage, 3,406 linear feet of 4-inch vitrified-clay sewer pipe for underdrains, 75 standard manholes, 68 standard catch basins, 3,925 linear feet of paved gutter, and 591 linear feet of 60-inch No. 1 gage bituminous-coated sectional corrugated-metal pipe with a brick invert to carry a sanitary sewer.

The major items covering structures of 20-foot span and under include:

Structure excavation	1,755 cu. yds.
Channel excavation	302 cu. yds.
Structural concrete, Class C	9.2 cu. yds.
Reinforcing steel	168 lbs.
Reinforced-concrete culvert pipe, 12-inch,	50 feet
Extra-strength bell-and-spigot reinforced-concrete pipe, 24-inch	536 feet
No. 8 gage paved bituminous-coated corrugated-metal culvert pipe, 36-inch	1,135 feet
Grouted riprap	257 sq. yds.
Vitrified-clay sewer pipe, 12-inch	45 feet
Plain cement-concrete pipe for storm sewers, 15-inch	108 feet
Plain cement-concrete pipe for storm sewers, 18-inch	2 feet
Bituminous-coated sectional corrugated-metal pipe, 60-inch	470 feet
Galvanized-metal bin-type wall, 5.5 feet thick	1,307 sq. ft.
Galvanized-metal bin-type wall, 7.7 feet thick	1,440 sq. ft.

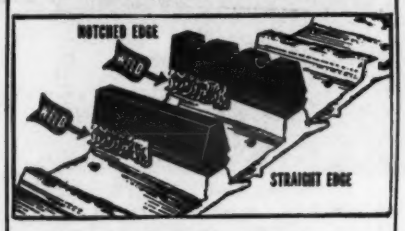
The major items for the railroad structure, which will not be built until steel is released, are as follows:

Structure excavation, unclassified	3,030 cu. yds.
Concrete, Class C, superstructure	160 cu. yds.
Concrete, Class E, walls	2,073 cu. yds.
Concrete, Class E, footings	1,191 cu. yds.
Waterproofing, Type A	980 sq. yds.
Waterproofing, Type B, 36 inches wide	90 sq. yds.
Membrane waterproofing, Type a	124 sq. yds.
Membrane waterproofing, including one prime coat, Type d	985 sq. yds.
Reinforced-concrete protection cover, Type c	875 sq. yds.
Reinforcing steel	171,717 lbs.
Structural steel	916,000 lbs.
Steel castings	32,000 lbs.
Field painting of structural steel and steel castings	948,000 lbs.
Sheet lead, 7.5 lbs. per sq. ft.	7,220 lbs.
Premolded cork expansion-joint material, ¼, ½, and 1-inch	764 sq. ft.
Bridge railing, 3-inch wrought-iron pipe	180 lin. ft.
Reinforced-concrete pilings	12,400 ft.

The roadside-improvement items on this contract include: seeding, 378,7

(*Concluded on next page, Col. 4*)

Rebuild your
TRACTOR GROUSERS
WITH BULLDOG
Grip-Lugs



Easily Welded
ECONOMICAL GIVES MORE PULLING POWER

See your local Equipment Dealer

Send for Folder CE

ALLIED STEEL PRODUCTS, Inc.
7835 Broadway
CLEVELAND 5, OHIO, U.S.A.

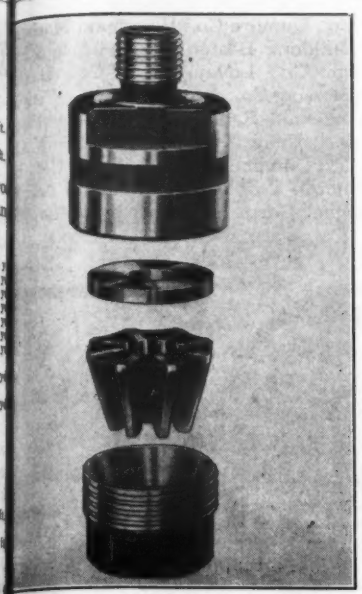
Bring Your Plans To REALITY with

Engineered BUTLER Design

Your site conditions, — methods of materials transport to and from your plant, — production demands and your market greatly influence the design of Central Mixing Plants, — Concrete Block Plants, and Ready Mixed Concrete Plants. Every installation involves an individual engineering and construction solution. It is because Butler engineers have successfully met the widest possible range of problems over a long period of years, that we suggest you utilize their experience, — to assist you to bring your plans to reality with BUTLER ENGINEERED DESIGN.

Illustrated in this Butler Bulletin are a wide variety of Butler Central Mixing Plants, Ready Mixed Concrete Plants, Concrete Block Plants and other Equipment, typifying BUTLER ENGINEERED DESIGN. Send for your copy. Ask for Bulletin 185.

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN



The new Jacobs drill chuck is featured by its ability to handle a wide range of drill sizes.

New-Type Drill Chuck

A new heavy-duty drill chuck utilizing a web of du Pont Neoprene synthetic rubber to maintain better alignment in the jaws, and which permits the chuck to handle a wide range of drill sizes, has been developed by the Jacobs Mfg. Co., Hartford 2, Conn. The Neoprene is bonded into the steel jaws, passing through anchor holes in them, to make the collet or inner socket of the chuck a compact conical unit. This Rubber-Flex collet is tightened by a screw mechanism which forces it forward into the smooth funnel-shaped nose of the chuck. As soon as the chuck is loosened, the rubber pushes apart the jaws to release the drill shank. The Neoprene is oil-resisting, has a low degree of permanent set, and has all-round toughness, the firm says.

The jaws of the collet, made of hardened alloy steel, are ground after assembly in the Neoprene matrix, and have parallel gripping surfaces for improved holding ability and accuracy. The rubber web makes possible a wide range of capacity. The collet is self-tightening, with a toggle-like action, providing non-slip holding power. It is stated that twelve Rubber-Flex collets and three detachable arbors will handle a range of drilling or reaming operations which would require 300 of the ordinary single-purpose collets.

This new chuck collet is being adapted to portable electric and hand drills.

Bulletin 45-P, describing the Rubber-Flex chucks, and giving dimensions and prices, may be secured from the manufacturer on mention of this article.

New Rayon-Cord Tire Is Made by Goodyear

A tire built with rayon instead of cotton cords, said to be "the most important development in tire making since Goodyear developed the cord tire", has been perfected by the Goodyear Tire & Rubber Co., Akron, Ohio, as a result of pre-war research and wartime experiences.

The new tire is said to be capable of greatly increased mileage, and is gasoline saving. The secret of its performance lies in the fact that rayon is lighter than conventional materials, yet stronger, generates less heat because it creates less friction in flexing, and enables the use of a much longer wearing tread, thus adding many thousands of miles to its service life.

"When the tire industry tackled the tough job of keeping America and its armed forces rolling on synthetic rubber," Goodyear said, "rayon almost literally saved all our lives. All large synthetic rubber tires, unless they were made with rayon cord, burned out prematurely." Up to the present, use of rayon has been limited to truck and other heavy-duty tires, and then in restricted amounts. However, it is anticipated that shortly there will be sufficient material to make possible quantity production of tires of all types.

New Dealer Firm in N. Y.

Walter Muller, President of the Ransome Machinery Co., has severed relations with that firm after 38 years, and has organized his own construction-equipment organization, the Muller Machinery Co., Inc., at 90 West St., New York 6, N. Y. He will serve both the domestic and export fields.

Expressway Grading

(*Continued from preceding page*)

square yards; fertilizer, 34,086 pounds; sodding, 850 square yards; honeysuckle, 2-year stock, 31,997 roots; common locust, 3 feet and 4 feet, 1,639 trees.

Personnel

The contract for the initial section of the Willow Freeway southeast of the center of Cleveland was awarded by the Ohio Department of Highways to Lombardo Bros. Construction Co. of Cleveland on its bid of $1,344,680.49, covering grading, drainage, structures, and roadside improvement. Fred Stolfuss is Superintendent for the contractor, with W. R. Anderson and D. R. (Dutch) Bower as Grade Foremen. The project is in Division 12 of which Robert J. Edwards is Division Engineer, and Walter Anderson, Assistant Division Engineer of Construction, with Edward Chadeayne as Project Engineer. Perry T. Ford is Director, Ohio Department of Highways.

GREATER POWER
EASIER HANDLING
LONGER LIFE

GET THINGS DONE with
GATKE
High-Heat-Resisting Asbestos
BRAKE MATERIALS
Service-proved for every Brake and Clutch requirement of Excavating, Road Building and Construction Equipment. Just tell us what you need.

GATKE MAKES
Brake Lining
Clutch Facings
Frictions
Non-Metallic Bearings
Sheet Packing

GATKE CORPORATION
224 N. La Salle St.,
CHICAGO, ILL.

LIKE A "300" BOWLER
FORM-SET ROPE
IS *Relaxed*

There was the bowler who, on the threshold of the magic 300, went out for a walk before his final roll. Tension was high, but the walk around the block settled his nerves. On the all-important roll, the pins went down and the perfect game was his . . . *because he'd relaxed!*

There's a great deal of that same relaxed quality in Form-Set rope. Form-Set is Bethlehem's preformed, and wire rope in the preformed construction has been relieved of many internal stresses and strains; freed of the locked-in tension that sometimes shortens rope life.

The helical wires don't have a nervous urge to straighten themselves out. Cut a section of Form-Set rope and see what happens. *Nothing.* The wires and strands lie just as they were. They don't pop loose or "wicker."

What's all this add up to? First, longer life (savings for *you*). Second, easy handling (something your *crews* will like). Third, better performance (that's what everybody wants).

Remember—no matter what grade of Bethlehem rope you buy, you can get it in the *relaxed* Form-Set construction.

When you think WIRE ROPE
. . . think BETHLEHEM

BETHLEHEM STEEL

Stream Banks Saved From Flood Erosion

(*Continued from page 1*)

however, there is an authenticated record of a maximum flow of 75,000 cubic feet per second in February, 1938, with a maximum of 35,000 to 40,000 cubic feet per second occurring almost every year.

Numerous methods of bank protection have been used with varying degrees of success. One type which has proved to possess material advantages utilizes second-hand railroad rails in its construction. The supporting units are formed of old 40-pound rails, spliced if necessary to obtain lengths of 30 to 45 feet. At the bottom end of each rail is welded a cross, formed of two 5-foot pieces of the same type of rail.

These rails are set in a nearly vertical position at 50-foot intervals along the toe of the bank by a small crane working from the top of the bank. At their tops the web and ball are cut away for 12 inches, leaving the base of the rail as a flat plate through which a hole is burned to provide for a ¾-inch bolt making a loose connection to a 30-foot rail with its ends similarly cut away. The other end of this anchor rail is bolted to a 7 or 8-foot length of rail driven into the ground well back of the edge of the river bank.

At 5-foot vertical intervals up and down the posts, ¾-inch cables are stretched horizontally and fastened to the rails by U-bolts which crimp the cable against the ball and base of the rail when drawn tight. These cables are extended and attached to deadmen placed up and downstream from the bank-protection structure. To the horizontal cables, fencing of 2½-inch mesh of 14-gage wire is attached by hand wiring at 5-foot intervals.

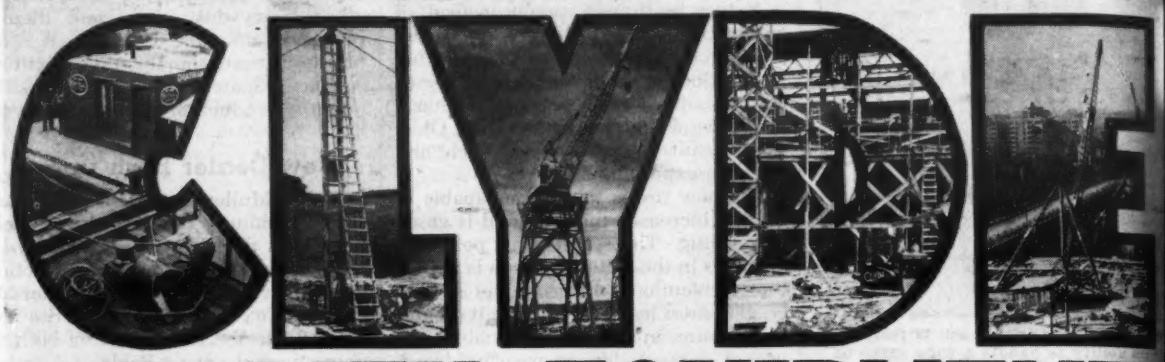
This type of bank protection, designed by H. E. Rowe, Engineer for the Spreckles Sugar Co., but not patented, has been used successfully by Monterey County for the past two years, during which time about 3,500 feet of it has been placed. One of its principal advantages lies in the fact that its effectiveness is not reduced by undercutting. In some cases it has dropped as much as 15 feet vertically without damage or impairment of its efficiency. If it drops enough to require them, extensions to the vertical posts can obviously be made quite easily.

The use of this type of bank protection is directed by County Surveyor and Road Commissioner Howard F. Cozzens of Monterey County, and its construction is usually performed under the direction of L. Camany, County Bridge Superintendent.

New Dealer in Charlotte

The Henry Walke Co., Norfolk, Va., jobber of mill and contractors' supplies and machinery, has announced plans for the establishment of a branch at Charlotte, N. C., from which to serve North and South Carolina. To be opened the first of the year, the office, store, and warehouse will be located at 1310 South Tryon St., in the heart of the city. J. E. Fussell has been named Manager of the new branch, with R. C. Fussell as his assistant.

A large stock of machine tools, small power tools, pipe, valves, fittings, and a full line of mill supplies, steel, and equipment for contractors will be carried at the Charlotte branch. The firms represented include: R. K. LeBlond Machine Tool Co.; Cincinnati Shaper Co.; Cincinnati Electrical Tool Co.; Carlton Machine Tool Co.; G. A. Gray Co.; Oster Mfg. Co.; Armstrong-Blum Mfg. Co.; Van Norman Co.; Skilsaw, Inc.; Weldon Tool Co.; Covel Mfg. Co.; Dumore Co.; Hammond Machine Builders; Boston Woven Hose & Rubber Co.; Lovejoy Tool Co.; Bastian-Blessing Co.; Armstrong Bros. Tool Co.; Ingersoll-Rand Co.; Marlow Pumps, Inc.; Union Twist Drill Co.; S. W. Co. Co.; Simonds Saw & Steel Co.; Plymouth Cordage Co.; Jones & Laughlin Steel Corp.; and Spang-Chalfant, I



QUALITY EQUIPMENT

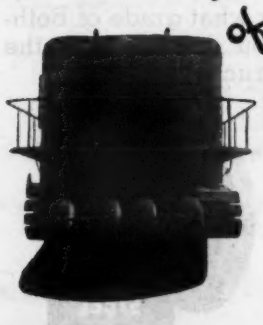
ANCHOR WINCHES
BAND FRICTION HOISTS
BARGE DERRICKS
BARGE HOISTING MACHINERY
BELT HOISTS
BLOCKS
BOOM HOISTS
BOOM SWINGING ATTACHMENTS
BUCKET HOLDING DRUMS
BUILDERS HOISTS
BUILDERS TOWERS
CABLEWAYS
CANE HANDLING EQUIPMENT
CAPSTANS
CAR PULLERS
CRANES – WHIRLEY TYPE
DERRICKS
DERRICK FITTINGS
DIESEL HOISTS
DOCK WHEELS
DRAG SCRAPER HOISTS
DREDGE HOISTS
ELECTRIC HOISTS
ELEVATOR TOWERS
ERECTORS GUY DERRICKS
GASOLINE HOISTS
GUY DERRICKS – STEEL
GUY DERRICKS – TIMBER
HAND POWERS
HIGH SPEED HOISTS
HOD HOISTS
HOOKS and SHACKLES
HORIZONTAL ENGINES
HORSEPOWERS
INDEPENDENT SWINGERS
LIGHTERAGE DERRICKS
LIGHTERAGE HOISTS
LOG LOADERS
LOCOMOTIVE CRANES
MATERIAL ELEVATORS
MINE HOISTS
MOORING WINCHES
PILE DRIVING EQUIPMENT
RAILROAD ERECTORS
ENGINES
SHAFT HOISTS
SHEAVES
SKELTON ENGINES
SKIDDERS
SLOPE HOISTS
STIFF-LEG DERRICKS – STEEL
STIFF-LEG DERRICKS – TIMBER
SNATCH BLOCKS
SUCTION DREDGE HOISTS
TIMBER BARGE FITTINGS
TIMBER DERRICKS
TOW HAULAGE HOISTS
TRACK LAYERS
TRAVELING DERRICKS
UTILITY DERRICKS
UTILITY HOISTS
WARPING WINCHES
WHIRLEYS
WINCH ENGINES
WINDLASSES
WIRE ROPE BLOCKS
WIRE ROPE SHEAVES
YARDERS

Order Now For Early Delivery

CLYDE

CLYDE IRON WORKS, Inc.
Duluth 1, Minnesota

A Thoroughly Proven Type of



ROGERS HEAVY DUTY TRAILERS gains wider acceptance

MANY riggers and contractors are solving low headroom problems with this distinctive Rogers Girder Type Trailer.

Road clearance is reduced to a minimum—loading and unloading are simplified—and loads move under bridges and low obstructions that would otherwise necessitate long detours and costly delays.

ROGERS BROTHERS CORP. ALBION, PENNA.

EXPERIENCE PERFORMANCE

Sales Engineer Wanted

Familiar with excavation equipment and other outdoor machinery. Must be mechanically inclined. For consideration, complete details of experience must be given in first letter. All replies held strictly confidential.

Address Box 259
CONTRACTORS & ENGINEERS MONTHLY
1719 Daily News Bldg. Chicago 6, Ill.

Better Trucks for YOUR Business!

"Rugged FORD Construction" Aided Finney Bros. in Tough War Task

Back in April, 1941, Paul and Charles Finney put their 3 Ford Dump trucks to work at Silver-Dale, Indiana, hauling crushed stone over rough, hilly country from quarries to road and munitions plant building sites. By August, 1942, the fleet had grown to 68 Ford Dump trucks and a half-ton pickup. According to Finney Brothers:

"The highest average of trucks out of service for repairs at any one time was approximately 5 per cent of the fleet. Rugged, safe Ford construction enabled Finney Brothers to fulfill their pledge to the war effort to 'keep 'em rolling.'"

New Ford Trucks are being built, and are available in the more popular models. They're the best in Ford history, better performing, more enduring, more economical. Order your new ones now, for earliest delivery.

Ford

ADVANCED ENGINEERING IN NEW FORD TRUCKS

More Economy and Endurance • Easier Servicing

A STILL GREATER 100 HP V-8 ENGINE with NEW Ford steel-cored Silvaloy rod bearings, more enduring than ever in severe service • NEW aluminum alloy cam-ground 4-ring pistons for oil economy • BIGGER, more efficient oil pump and IMPROVED rear bearing oil seal • NEW longer-lived valve springs • NEW improvements in cooling • NEW efficiency in ignition • in carburetion • in lubrication • in ease and economy of servicing operations • And available in all truck chassis except C.O.E. units—the rugged, thrifty 90 HP FORD SIX-CYLINDER ENGINE, with many important advancements.

FORD CHASSIS ADVANTAGES: Easy accessibility for low-cost maintenance • Universal service facilities • Tough, forged front axles • Extra-sturdy rear axles with pinion straddle-mounted on 3 large roller bearings, ¾-floating type in light duty units, full-floating in all others • 3 axle ratios available (2 in 1-ton unit) • 2-speed axle available in heavy duty units at extra cost • Powerful hydraulic brakes, large drums, cast braking surfaces • Rugged 4-speed transmission with NEW internal reverse lock optional at extra cost on light duty units, standard on all others.

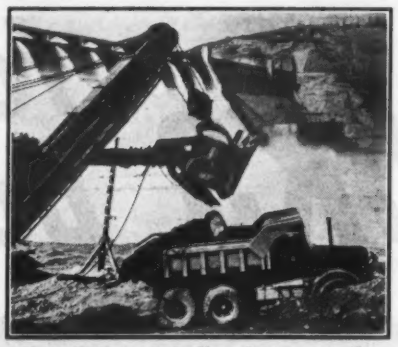
FORD TRUCKS

MORE FORD TRUCKS ON THE ROAD • ON MORE JOBS • FOR MORE GOOD REASONS

New Heil Dump Bodies Work on Dam Project

A fleet of twelve heavy-duty trucks equipped with pilot models of the new Heil rock bodies and Heil twin-arm hoists developed during the war for post-war use were put into service at Grand Coulee Dam on March 15, 1945, and in less than six months moved 480,000 tons of rock and other excavated materials over difficult terrain with a total mileage of 372,000. These specially designed bodies have been officially named Coulee Dam type body by the U. S. Bureau of Reclamation, and they will be designated as such on future projects.

These new units, only a small portion of the many bodies and hoists produced by the Heil Co., Milwaukee 1, Wis., which were active during the 27,000,000-cubic-yard excavation job at Grand Coulee, are being used for channel improvement and bank protection below the huge structure. They are loaded by power shovels, climb 550 feet to the top of the dam, traverse its 4,173-foot length, and travel upstream to dump their 23-ton loads wherever fill is needed.



New Heil rock bodies, known as the Coulee Dam type body, are in service hauling 23-ton loads for channel improvement and bank protection at Grand Coulee Dam.

The main structure of the dam itself, which is 500 feet thick at the base and covers about 30 acres was completed on January 1, 1942. It is the most massive man-made masonry structure in the world and forms the first and most important unit in the Columbia Basin Reclamation Project. When fully developed, Grand Coulee Dam will be the biggest power plant in the world with a capacity of 2,700,000 hp, will provide irrigation for over 1,000,000 acres of land, and improve downstream navigation. The end of the war is expected to speed up work on the project which has employed as many as 8,000 men.

New Welding Engineers

Five appointments of welding engineers have been announced by the Lincoln Electric Co., Cleveland, Ohio, as follows: John A. Smithers, Detroit office; W. L. Herbst, Chattanooga, Tenn., office; Harold H. House, for the Moline, Ill., district; C. M. Burnett, Boston, Mass.; and L. B. Wallner, Duluth, Minn., replacing I. R. Bartter, who has been promoted to welding engineer at the Grand Rapids, Mich., office.

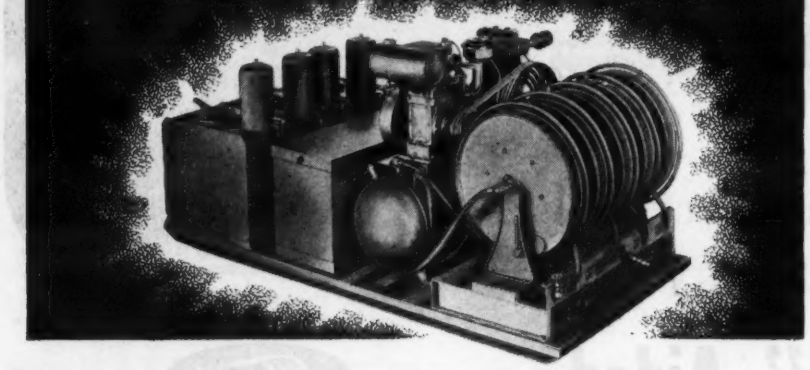
Pressure Distributor Brochure Now Availab

Bituminous pressure distributors f use by contractors and state and coun highway departments are illustrat and described in a booklet, "Here's t Story in a Nut Shell," recently issu by Littleford Bros., manufacturer black-top road equipment. The featu of Spray Masters, and the Spray Ki Model M, including center folding spr bars and the heating systems used, a discussed.

The Spray Master CLFA is availab in sizes from 800 to 2,000 gallons, a CLRA from 800 to 3,000 gallons. Mo M is a light-weight distributor for wo where fast heating is not essential. T styles of center-folding spray bars, standard and the circulating, both which may be used in spraying widt up to 24 feet, are shown.

Copies of the booklet may be o tained by writing Littleford Bros., In 485 East Pearl St., Cincinnati 2, Oh

GRACO
CONVOY LUBERS



KEEP HIGHWAY EQUIPMENT
FIT AND FIGHTING

● Because Graco Convoy Lubers bring complete lubricating service directly to your equipment while it is "on the job", lost time is reduced to a minimum and you get increased production as an added profit. Because Graco Convoy Lubers are always ready to provide the right lubricant at the right time, applied with the right pressure, you can always be certain that "lubrication schedules" will be on time.

Keep those big units of yours moving, keep them fit and working by giving them proper lubrication at scheduled time. By servicing them with Graco "field tested" lubrication equipment you will be assured long life and efficient service.

The New Graco "BLOCK BUSTER"

Other Lubricating Equipment

Other Graco tools for servicing construction equipment include portable air-operated pumping units, hand-operated chassis and gear lube pumps, and hand guns for every lubricating purpose. Write for latest catalog No. 191.

GRAY COMPANY, INC.
Minneapolis 13, Minnesota

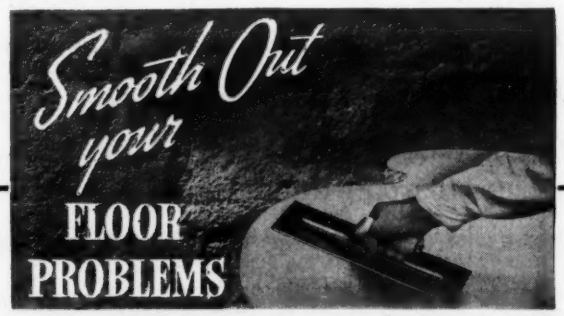
GRACO

McKiernan-Terry
PILE HAMMERS

AND EXTRACTORS

These pioneer double-acting hammers embody improvements that have long made them first choice of engineers and contractors on both large and small construction projects all around the world. The first hammers built for under-water driving. First hammers made adaptable for demolition work on concrete, masonry, even quarry rock. Efficient, dependable, economical in operation. Double-acting hammers available in ten standard sizes; double-acting extractors in two sizes; single-acting hammers in five sizes. For complete information write for bulletins No. 55 and No. 57.

McKIERNAN-TERRY CORPORATION
19 Park Row, New York 7, N. Y.



with PLASTIC ROCK!

Trowel a smooth, tough, plastic surfacing right over your old concrete or wood floor.

Plastic Rock comes complete, packed in barrels. Nothing more to buy. No application "formula" to confuse you. Simply mix and trowel right over old floor. Average depth one-half inch. Old floor Saturday is a new floor Monday. Also patches concrete to a perfect feather edge. Plastic Rock is absolutely spark-proof, skid-safe wet or dry, dustless, silent. Feels like cork under foot. Cannot splinter, crack, crumble, curl or loosen. Heavy loads on steel wheels actually improve it. Five-year-old floors show no wear. Natural color is dark gray. Used by U. S. Army, Navy and largest industries in America. Your contractor or your own crew can apply. Write now for complete information.

Ask for your copy of Report 220-C

UNITED LABORATORIES, INC.
16815 EUCLID AVENUE · CLEVELAND 12, OHIO
Export Division: WASHINGTON INTERNATIONAL SALES, Washington, D.C.
In Canada: STORRAR MANUFACTURING COMPANY, Weston, Ontario

The Road Program Still Needs Plans

Report to ARBA Quarterly Meeting Shows Finances Strong but Volume of Plans Still Below That Needed

IN 1944, construction reached its wartime low of $4,000,000,000, dropping from the 1942 peak of $13,500,000,000. However, according to the report of Charles M. Upham, Engineer-Director, to the quarterly meeting of executive committees and directors of the various divisions of the American Road Builders' Association at Chicago in September, total construction will reach $6,000,000,000 in 1946 and increase further to $9,000,000,000 in 1947 and to $15,000,000,000 by 1949. These amounts are the result of estimates by the Federal Works Agency. This is as fast as postwar construction can overcome the inertia of its slack period towards the end of the war when no equipment was available for civilian projects, labor was practically non-existent, and materials were very scarce.

The trend in highway construction, which has amounted to only $325,000,000 in 1945, its minimum for all the war years, has been downward ever since the 1941 high year of $1,000,000,000. It dropped to two-thirds that figure in 1942, to $500,000,000 in 1943, to $400,000,000 in 1944, and this year's low of $325,000,000. The Federal Works Agency believes this will be stepped up to $750,000,000 in 1946, continually rising to a top of $2,000,000,000 by 1949, and then flatten off at approximately that figure for several years.

Financing

There has been much hue and cry about where the money is coming from for such large highway expenditures, but in view of the conservative estimate of 10,000,000 to 15,000,000 new cars on the highways of the United States within a very few years, with the pent-up desire of everyone from salesmen to families to get out on the road again, the gasoline taxes collected by the states will amply finance the costs of all new highway construction. As the climb in expenditures will be steady to over $1,000,000,000 in 1947, through $1,500,000,000 in 1948, to the peak of $2,000,000,000 in 1949, the increasing income from user taxes will keep pace. Remember, the top figure for 1949 is 60 per cent greater than that of 1930, $1,450,000,000, the all-time high of highway construction.

Status of Road Plans

State highway departments have only partly dissipated the general lag evident six months ago, so that as of August 1, 1945, according to the Public Roads Administration, only $616,000,000 of contract plans was then ready, with an additional $2,500,000,000 of plans on the drawing boards awaiting completion.

Estimates from active counties with highway organizations working on postwar road plans show that $250,000,000 of work is ready for contract. In the cities of the country $150,000,000 of needed construction on streets is already in the blueprint stage, according to a recent ARBA survey. This gives a grand total of $1,000,000,000 of road work ready to let by states, counties, and cities, and is being added to daily.

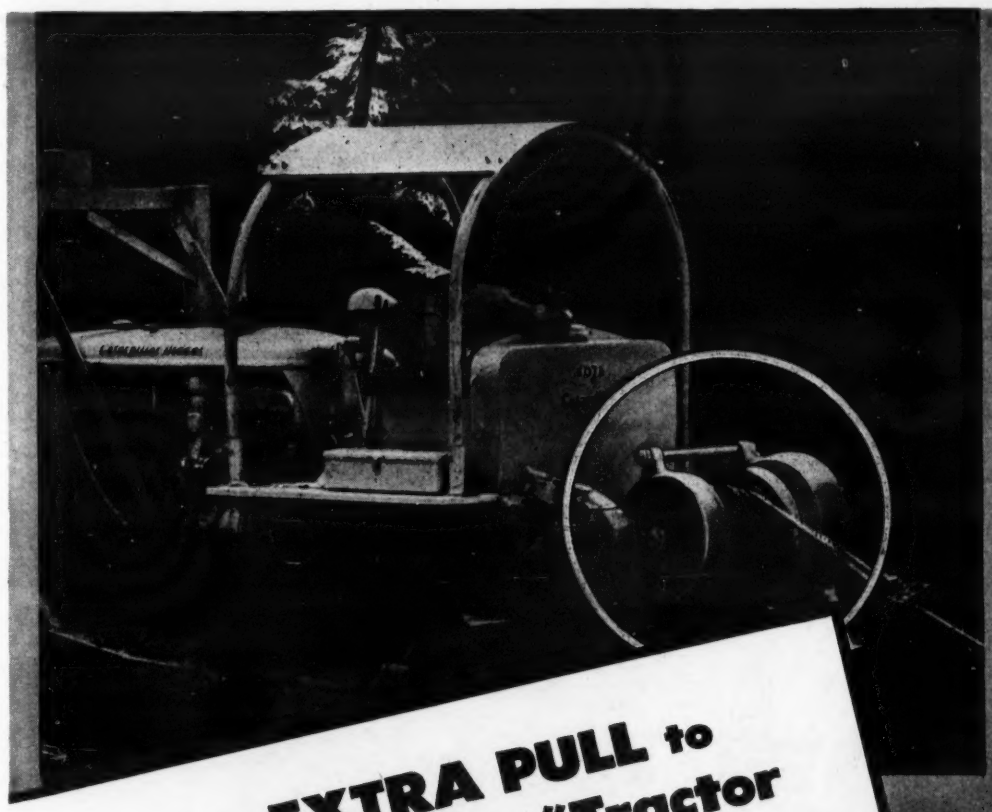
With a total of $2,212,000,000 available in the next eighteen months from Federal-Aid and matching state, county, and city funds, we are still sadly behind in the production of plans. It is only through the application of the utmost diligence on the part of all states which have not produced their full volume of contract plans, and equal application on the part of all counties and cities, that the program will be able to keep pace with the finances made available on the basis of economic need.

Federal Aid

The Federal-Aid Act of 1944 was the largest ever passed by the Congress for highway construction. With the pas-

(*Concluded on next page*)

"I might have known that you couldn't pick up practical tunnel engineering through that correspondence course you're taking."



HYSTER

Adds EXTRA PULL to your "Caterpillar" Tractor

"Caterpillar" in a tractor means workability and tremendous drawbar pull. A Hyster winch on a "Caterpillar" adds more power to pull — 50% to 80% more drawbar capacity—an unbeatable combination for the tough jobs.

Hyster Company produces a complete line of tractor equipment for "Caterpillar" track-type tractors; winches, donkeys, yarders, cranes, sulkies, logging arches. *Hyster has specialized in "Caterpillar" equipment since 1929. Hyster is the world's largest maker of tractor winches.*

This means that the same high standards of precision engineering, enduring quality and rugged performance that characterizes "Caterpillars" also are basic features of Hyster products.

It means, also, that more than 300 "Caterpillar" distributors and dealers throughout the world sell and service Hyster tractor equipment.

There is a "Caterpillar" distributor or dealer near you. Ask him about the "Caterpillar"-Hyster combination best suited for your work.

HYSTER COMPANY

2952 N. E. Clackamas PORTLAND 8, OREGON

1852 North Adams PEORIA 1, ILLINOIS

World's largest manufacturer of Tractor Winches • Builders of Hyster Industrial Trucks
Service Offices in principal world cities

HYSTER
FOR ANY LIFT OR PULL

"T-N-T" QUICK TUNE-UP OIL
For NEW Motor Performance
Increases POWER and S-P-E-E-D
SAVES FUEL
Used With All Types Fuels and Oils.
Keeps Engines Clean Internally.
Cuts Maintenance Costs
CHAMPION CHEMICAL CO.
STEPHENVILLE, TEXAS

The Highway Program Still in Need of Plans

(*Continued from preceding page*)

sage of a concurrent resolution, releasing these funds for use, by the House on September 27 and the Senate on October 2, the greatest highway program of our history is freed of all legal tethers and may go into active construction. The freeing of these funds, together with other funds on hand, makes possible an approximate program for the calendar year 1945 as follows:

Unobligated balances	$106,000,000
State matching funds	106,000,000
Federal-Aid, fiscal year 1945-46	500,000,000
State matching funds	500,000,000
Federal-Aid, fiscal year 1946-47	500,000,000
State matching funds	500,000,000
Total	$2,212,000,000

In addition, approximately $115,500,000 of Federal funds will be available during the fiscal years 1945-46 and 1946-47 for the construction of public-land roads.

The largest Federal-Aid appropriation for any one year, prior to the $500,000,000 for 1946, 1947, and 1948, was in 1936 when $331,000,000 was made available. The average annual Federal Aid from 1939 through 1942 was $165,000,000. From 1916, when Federal Aid was initiated, to 1933, Federal monies constituted only 6 per cent of the total financing of state highways. From 1934 through 1936 the Federal funds equalled the state expenditures. Recent Federal contributions have been only 30 per cent of all funds expended in highway construction. It is of interest to note that no state has ever lost its Federal Aid through delay in putting its projects under construction.

This nation can justifiably spend $16,000,000,000 to bring its war-torn and obsolete highways up to par and to carry traffic through and around metropolitan centers, even before consideration is given to the financing of the Interregional Highway System.

Conclusion

The highway industry, the stabilizer wheel of the economic structure of this country, is ready to carry its burden. The only retarding factor today, according to Hamilton Penn, nationally known New York construction-equipment distributor, and President of the Associated Equipment Distributors, is the immediate disposal or release of new surplus equipment for use in 1946, so that contractors may strengthen their depleted and well worn equipment until the manufacturers bring to fruition their plans for new models to provide more economically operated machines for faster dirt moving; speedier concrete production, spreading, and finishing; and for the greater production of asphalt mixes and their laying. These manufacturers are in the same position as the automobile manufacturers today. They are now producing 1942 models of their construction equipment, but are working hard and late on improvements for the benefit of all users. These will be ready very early in 1947.

Buy—and keep—Victory Bonds!

Le Roi Sales Appointment

A. J. Bartlett, sales engineer for t Le Roi Co., Milwaukee, Wis., has be appointed Manager of Industrial Engi Sales. Ten years with Le Roi, Mr. Ba lett was in the Experimental Depar ment, before joining the sales staff.

adeco...

NOZZLE TESTER

Keeps Diesel Engines Running Efficiently

To keep diesel engines operating at peak efficiency, this portable, precision-built Adeco Nozzle Tester is indispensable.

Light in weight yet built for heavy-duty service, it enables any mechanic to make quick accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Tests both large and small injectors, on bench or engine, at pressures up to 10,000 p. s. i. Prevents costly delays and possible damage to engine.

Ideal for testing hydraulic devices.

Write for bulletin on this practical, low-cost unit.

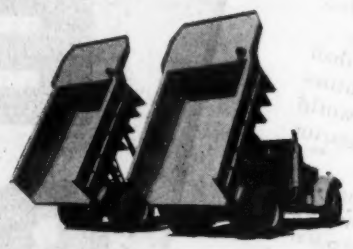
TESTS FUEL INJECTORS AND HYDRAULIC DEVICES at Pressures up to 10,000 p.s.i.

ADECO AIRCRAFT & DIESEL EQUIPMENT CORP.

DEPT. 9: 4411 N. RAVENSWOOD AVE. CHICAGO 40, ILLINOIS

Twenty Tons...

PLENTY TOUGH!



MARION BODIES

"HAUL IT AND HAVE IT"

Yes, they can haul up to 20 tons of rock, for they have that specially-engineered construction that makes them ask for more where others would ask for mercy.

The bodies pictured are made with ¼" steel shell and 2" oak floor under a ⅜" wear plate. They have twin telescopic straddle mount hoists.

Marion offers a full line of dump bodies and hoists. If you require truck bodies of special design, MARION engineers will do your job effectively and economically.

See Your Local Distributor or Write

THE MARION METAL PRODUCTS CO.

BODY and HOIST DIVISION, MARION, O.

★ Buy Victory Bonds

★ Save Waste Paper

★ Turn in Scrap Metal

★ Be a Blood Donor

★ Pay only Ceiling Prices

Equipment for the construction of a U. S. Navy landing field at Bettles, Alaska, had to be hauled over a snow road. Here a Caterpillar diesel towing a scraper and a dump truck join the parade.

Role of the Magneto In Internal Combustion

"The Fundamentals of Magneto Ignition", a 64-page handbook for ignition service technicians, has been published by Fairbanks, Morse & Co., Magneto Division, Beloit, Wis. Profusely illustrated with drawings and photographic reproductions, the work provides a discussion of the principles of magneto ignition, as well as an extensive review of magnetism and electricity. An analysis of ignition requirements leads to the description of various systems, their development, application, and impulse coupling adaptations. Extensive treatment is given to magneto service suggestions helpful to the men responsible for equipment care in highway department and contractors' shops.

Modern magnetos are compact, self-contained units designed and constructed specifically for the production of controlled electrical spark discharges of adequate strength to meet the ignition requirements of internal-combustion engines or of similar applications. Entirely independent of any exterior source of electrical or chemical power, they rely solely upon mechanical energy.

In spark-ignition engines, the ignition problem is of great importance to the designer who must consider many factors in making the original engine layouts, among them: shape of combustion chamber; type of spark plug; possibility of pre-ignition; intensity of ignition spark; ignition during starting period; effects of compression and speed; ignition sparks during exhaust strokes; and timing of the ignition spark. Spark-ignition engines are built to operate at rotative speeds ranging from 75 to 6,000 rpm, necessitating a magneto capable of functioning throughout this range. The impulse coupling used to provide starting ignition must be able to cut out before idling speed is reached. The common practice is to operate magnetos on slow-speed engines at either crankshaft or twice crankshaft speed, and on high-speed engines, at half crankshaft or camshaft speed. Heavy-duty magnetos with oversize coils and magnets are likely to be required on low-speed engines so as to secure sufficiently strong ignition sparks. As compression within the cylinders of an engine increases, the voltage required to produce ignition sparks also increases.

In adapting a magneto ignition system to a specific engine, many other factors must be considered, and in general many details of the magneto's construction are determined by the type of service for which it is to be used. Because magnetos are built to the specifications of many manufacturers, there are countless variations in the field, and standardization seems impossible since most of the factors causing the variations are beyond arbitrary control.

Free copies of this handbook, Bulletin FM123, may be secured by writing direct to Fairbanks, Morse on your business stationery and mentioning this review.

The Tire Situation

Rationing of tires for trucks and passenger cars is expected to continue until the end of the year, but tractor and implement tires are now free of rationing, the B. F. Goodrich *Rubber News Letter* reports. The reason for the continued scarcity of truck tires is due primarily to the shortage of skilled tire builders. Although the production of tires available for civilian use is rising, they will continue to be in short supply for some time.

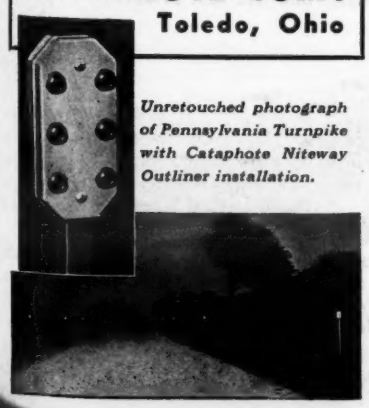
Rubber manufacturers believe it will be several months before any sizable amount of crude rubber can be shipped into this country, although the speed with which crude can be made available depends on the condition of plantations and equipment freed from the Japanese.

DAY AND NIGHT
SAFETY SIGNS
Now Available!

Cataphote Metal Signs for all traffic control requirements now available! These signs and markers equipped for 24-hour-a-day duty with famous Cataphote Reflector Buttons. Used coast to coast for safer highways.

Outstanding in appearance and legibility. Write.

CATAPHOTE CORP.
Toledo, Ohio



Unretouched photograph of Pennsylvania Turnpike with Cataphote Niteway Outliner installation.

"Bring on your TOUGH JOBS

Our equipment is wear-proofed with STOODY SELF-HARDENING now!"

WHEREVER you go—whatever the job, you've got to figure on equipment maintenance costs. Parts *will* wear out, equipment must go down for repairs. But there *is* a way you can lower both operating costs and downtime. Here's how:

Next time your power shovels are down for repairs, try Stoody Self-Hardening on the bucket sides, bottoms, lips, runners and teeth; also on track pads, rollers, tumblers, idlers and other wearing surfaces. In the past these parts were often built up with high carbon or manganese rods. But here's the catch: Although these electrodes cost a few cents less than Stoody Self-Hardening, all three require approximately *equal application time*, and equal shovel down-time—*yet there's no comparison in wear resistance between Stoody Self-Hardening and the others!*

For building up worn areas before hard-facing with Stoody Self-Hardening, specify the new Stoody Manganese. You'll get greater speed of deposit, easier slag removal, low penetration with high build-up.

Differences in total cost between reclaiming shovels with any of the above three electrodes is negligible. However, Stoody Self-Hardening will conservatively give double the wear of manganese deposits . . . several times the wear of high carbon. Stoody Self-Hardening likewise bonds well with manganese parts, is easy to apply and won't chip under impact.

If you're looking for longer power shovel life with no extra trouble, order 100 lbs. of Stoody Self-Hardening today and give it a trial. Costs 50 cents per lb., f.o.b. 600 U. S. distributors or Whittier, California.

If you want to study typical photos and information on applying Stoody Self-Hardening to all types of heavy equipment, write for our free booklet, "Specification Sheets." There is no obligation. STOODY COMPANY, 1136 West Slauson Ave., Whittier, California.

STOODY HARD-FACING ALLOYS
Retard Wear Save Repair

Serrated Blade Used To Speed Ice Removal

Specially Developed Blade Under Truck, and Mechanical Spreader for Rock Salt, Help Clear County Roads And Prevent Accidents

By E. E. FERRIS, County Engineer, Ingham County, Mich.

✦ IN Ingham County, Mich., with crippling blizzards an accepted feature of normal winter weather, only constant improvement of existing methods of ice removal can keep the roads and highways open at all times. It has been necessary to develop effective short-cuts in snow and ice-removal operations for secondary or gravel-surfaced highways, because quick action is just as important there as it is on concrete and asphalt paved main arteries of traffic.

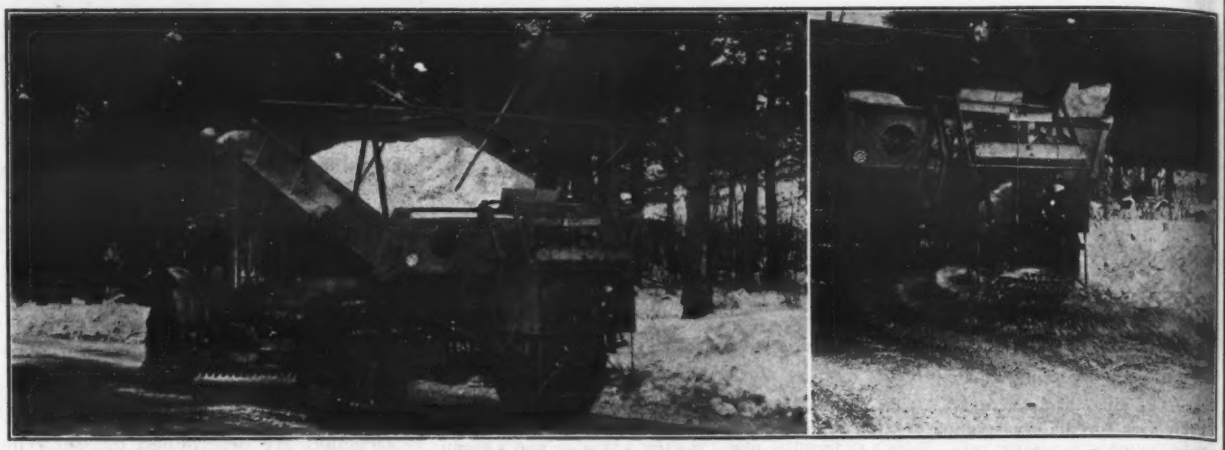
After a great deal of experimenting on secondary roads, Ingham County developed a serrated blade that can be used to speed up complete snow and ice removal. As a result, it is now part of the standard operation to send out a truck, loaded with rock salt, equipped with a mechanical spreader attachment at the rear and with a serrated or saw-toothed blade bolted under the body of the truck.

For greater efficiency, the blade is made in two sizes, 5 and 6 feet long for different road widths. Both blades have 2½-inch teeth with 4-inch-wide openings between. These are slightly curved to offer greater resistance to any stubborn ice formations and to prevent the teeth from breaking off should they hit sections of heavily matted ice. This curved moldboard is primarily a scoring or notching implement, and only sufficient pressure is used to enable the blade to scratch approximately ⅛ inch from the surface of the packed snow or ice. If it is forced through the ice layer to a greater depth, there is too much danger of resulting damage to both blade and truck.

The Unit in Action

As the truck moves slowly down the road in a straight line, the blade is dropped into scoring position and the rock salt is released into the automatic spreader. Distributed at a rate of 400 to 500 pounds per mile on a 20-foot pavement, the rock salt falls into the grooves in the ice made by the serrated blade. In this way none of it is thrown off the road surface and, in addition, its melting action is greatly speeded. By the time the plows and scrapers can be diverted from main highways, snow and ice are already broken up, sometimes removed entirely.

As an accident preventive, it has also been found that this method of scoring ice or packed snow is an effective aid in controlling car skids, should any occur before the roads have been cleared. Since the tendency of cars in a skid is to spin and leave the pavement, the grooved road offers greater protection to them, keeping them in position on the road until the brakes can hold. In addition, the rock salt acts as an abrasive, affording better traction to tires on slippery surfaces.



Ingham County's ice-removal unit consists of a serrated blade mounted under the truck, to roughen the ice or hard-packed snow, and a mechanical spreader distributing rock salt at the rate of 400 to 500 pounds per mile of 20-foot road surface.

Chicago Distributor Is Building New Plant

Ground was broken recently in the Chicago suburb of Bellwood for the new plant of the Patten Tractor & Equipment Co., exclusive distributor of Caterpillar Tractor Co. products in northern Illinois and northwestern Indiana. To cost more than $300,000, the plant will comprise a main building covering 18,000 square feet, and two auxiliary buildings for an additional 10,000 square feet for storage and special services. It is located on a 150,000-square-foot plot, and is scheduled for completion by next March.

The establishment will include a 100-foot display room, a theater seating 100 persons and fully equipped for sound projection, a 12,000-square-foot service department, and a 10,000-square-foot parts department. Extensive facilities are planned for the convenience of customers and visitors.

CLIP THIS ADVERTISEMENT—CHECK CATALOGS WANTED

MASTER COST-SAVING EQUIPMENT—FOR IMMEDIATE DELIVERY

Portable Gas-Electric Generator Plants. Sizes 500 to 17000 Watts (Catalog No. 594)
General Purpose Floodlights
Gas or Electric Concrete Vibrators (Catalog No. 689)
Gas or Electric Grinding Machines and Power Tools (Catalog No. 683)
BIG-3 for Generation, Tool Operation and Concrete Vibration (Catalog No. 687)
Hand Tools for Vibrators, BIG-3, and Grinding Machines (Catalog No. 683)
"Power-Blow" Electric Hammer and Spade (Catalog No. 688)
Electric Pavement Breaker (Cat. No. 718)
Gas or Electric Back-Fill Tampers and Tie Tampers (Catalog No. 699)
Vibratory Concrete Finishing Screed. Sizes 6' to 30' (Catalog No. 596)
"Turn-A-Trowel" for trowelling concrete Sizes 48" or 34" (Catalog No. 685)
Speedmaster and Cablemaster Hoists; 500 to 6000 lbs. cap. (Export only) (Catalog No. 706)

CLIP THIS ADVERTISEMENT—CHECK CATALOGS WANTED

Send for illustrated catalog on any item to

MASTER VIBRATOR COMPANY

DAYTON 1, OHIO

built for the TOUGH jobs!

JAHN Heavy Duty TRAILERS in Capacities from 5 to 100 TONS

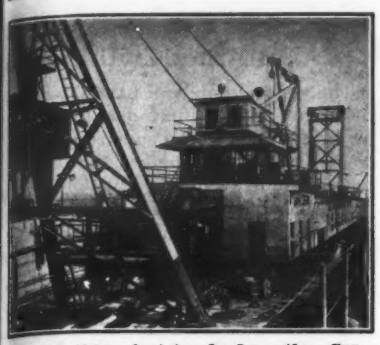
• Jahn heavy duty trailers have long been noted for their ability to handle the *tough* hauling jobs. With rugged in-built stamina, they have the strength to take the strains of heavy loads without distortion. Rigid cross-braced frame, improved goose-neck construction, spring mounted front and rear axles . . . consider all these finer construction details when you are buying a heavy duty trailer. Write today for full information.

Jahn Trailers Now Available with Hydraulic Brakes!

C. R. JAHN COMPANY

1347 W. 37th Place, Chicago 9, Ill.

"Come to Trailer Headquarters"



When this electric dredge, the San Diego, went into dry dock recently, a section of hull treated four years ago with Amercoat No. 23 proved to be in excellent condition, free of rust or effects of salt water.

Protective Coating Is Tested on Dredge

A four-year comparison test of a plastic coating for metal subjected to corrosive action was completed recently when the Case-American Construction Co.'s electric dredge San Diego was taken into dry dock, and a graphic picture of the anti-corrosive properties of Amercoat No. 23, with which a portion of the hull had been treated, was revealed. It is stated that this product may revolutionize conventional methods of protecting metal hulls and other structures against corrosion.

In 1941, approximately 850 square feet on the port corner of the San Diego's hull, next to the dredge ladder, was treated with Amercoat No. 23 which consists of a prime coat, body coats, and seal coats. It covered the sides up to the lower wooden fender which is slightly above the water line and across the bottom to the ladder recess. The surface was sandblasted down to bright metal so that it was perfectly dry and clean. One coat of prime was applied by brush, two coats of body coat by spray, and three of seal coat, also by spray. The remainder of the dredge was similarly sandblasted down to bright metal, and painted by conventional methods.

It is reported that in July, 1945, after over four years of service, on removing the barnacles and other accumulation from the surface, the Amercoat covering on the sides and bottom was found to be tough, durable, and intact, still providing protection to the metal, with no rust beneath the coating. On the remainder of the hull, there were pockmarks and serious rusting over the entire surface.

Because of the successful record of the Amercoated test section, the entire hull of the San Diego was treated with Amercoat before the dredge was returned to service.

Further information on the use of this product for protecting not only marine equipment but any other metal structures subjected to rusting and corrosion may be secured direct from the American Pipe & Construction Co., Los Angeles, Calif.

Kentucky Highway Construction Plans

Approximately 550 projects involving $150,000,000 worth of road construction are included in the Kentucky Department of Highway post-war plans, Commissioner J. Stephen Watkins told the Frankfort Board of Trade recently. Surveys have been made and plans developed for the immediate construction of $15,000,000 to $20,000,000 worth of roads as soon as the Federal Aid provided by the Highway Act of 1944 is available.

Mr. Watkins estimated that, of a total of 60,000 miles in Kentucky's primary-highway system, rural roads, and city streets connecting through highways, at least 50 per cent are in need of repair or reconstruction. Much of the 27,000 miles of rural roads serving 130,000 Kentucky farm units will be impassable this winter, he stated. Commissioner Watkins broke down the state's total mileage as follows: 10,000 miles in the primary system, 3,000 in connecting streets, and 47,000 in rural county roads. The Federal-Aid and state funds will be apportioned $25,000,000 for primary roads, $20,000,000 for secondary roads, and $9,000,000 for connecting streets.

ARBA 1946 Meeting

The annual meeting and convention of the American Road Builders' Association will be held at the Stevens Hotel, Chicago, January 14-17, 1946. Coming immediately prior to the 1946 construction season, the convention should be of unusual importance and interest, the committee says. Late developments in design, construction, and engineering for highways and airports will be presented. The presence of representatives from many branches of the highway profession and industry should afford excellent opportunity for the interchange of ideas.

Hard-Facing Saves $19.00 Roller Replacements

Generally a one-pass layer of Coast Metals is all that's needed to restore original dimensions. Where rollers are badly worn, first build up the surface almost to finished size with mild steel.

THE NEXT TIME your double-flange tractor rollers become badly worn, try reclaiming them with Coast Metals Hard-Facing. Not only will the cost of new rollers be saved, but delays in getting replacement parts are avoided. Idle labor is reduced to a minimum. One company reports a replacement saving of $19.00 for each roller reclaimed as well as other savings.

Coast Metals Hard-Facing is extra-resistant to wear and abrasion of dirt and sharp sand. Technical Pamphlet 201 goes into detail. Write for this today.

COAST METALS, INC.
Plant and General Offices: Canton, Ohio
Executive Offices: New York 19, N. Y.

COAST METALS hard-facing weld rods
MAKE YOUR EQUIPMENT LAST LONGER

This Power Clutch NEVER "Takes Over"

RETAINS "FEEL" OF THE LOAD
Unlike a booster clutch, which gives the operator no more than "on-or-off" control, the Koehring 605 Power Clutch never takes over. Simple linkage maintains constant control over the main clutch band. Complete control is maintained over the in-between stage, between full engagement and full disengagement. There is no continuous slipping booster, no complicated, sensitive network of air lines.

ONE-TENTH THE LEVER PULL
In all operations, a light lever pull sets this powerful 37-inch clutch—only 1/10 the pull required to set a manual clutch of comparative size.

AUTOMATIC HEAT ADJUSTMENT
Continuous, time-consuming adjustments for heat expansion are unnecessary on the Koehring Power Clutch. A large compensator spring automatically makes the required tension changes.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

KOEHRING 605

KOEHRING HEAVY DUTY
HEAVY-DUTY CONSTRUCTION EQUIPMENT

McKiernan-Terry Corp. Resumes Normal Work

Resumption of full peacetime activities has been announced by the McKiernan-Terry Corp., manufacturer of pile-drivers, hoists and winches, and allied equipment. The firm's war activities included the design and manufacture of numerous machines for the Army, Navy, and Maritime Service.

The eight-page announcement pictures the McKiernan-Terry plants at Harrison and Dover, N. J., and some representative types of the organization's peacetime products, as well as a number of special machines built at the request of war agencies. It may be secured from the firm's office, 19 Park Row, New York 7, N. Y.

Line of Hose Revamped; Hewitt Boston Dealer

The revision of its line of industrial hose, with rearrangement of brands for more adequate service, has been announced by the Hewitt Rubber Corp., 245 Kensington Ave., Buffalo 5, N. Y. The firm is distributing a new hose catalog which lists each item by brand, type, and specifications, copies of which will be sent by the company on request.

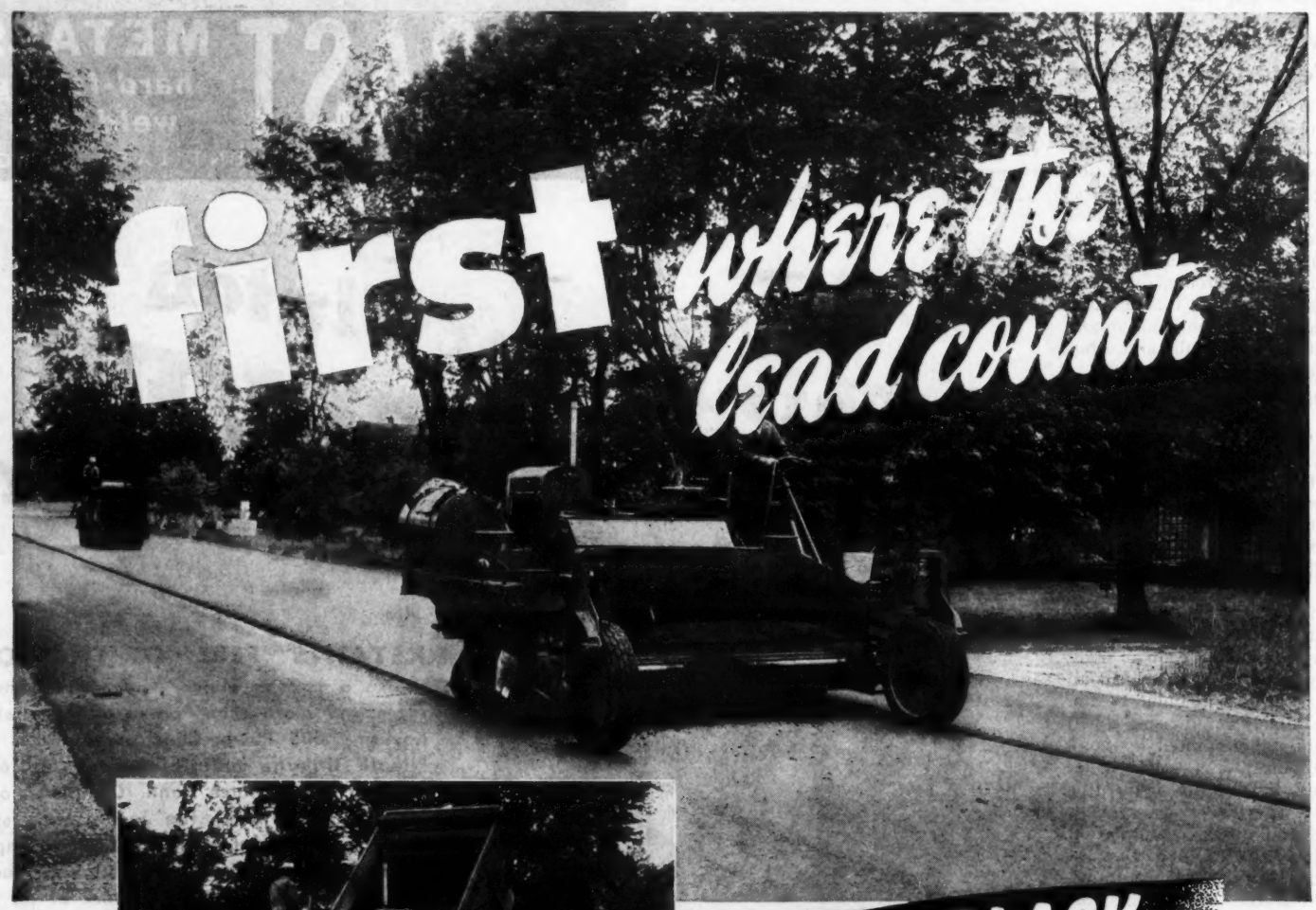
The Hewitt top-quality "super" grade hose, known in the past as Maltese Cross, has been renamed Monarch. High-grade Hewitt hose will in the future be called Ajax, and utility or general-service hose, Conservo. The "double barreled" hose developed for the welding industry will continue to be known as Twinweld.

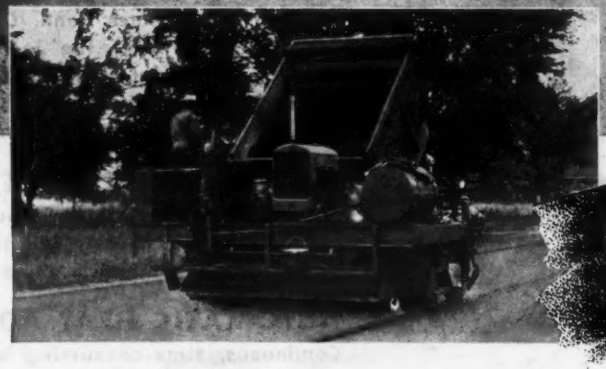
The company has announced the appointment of the P. J. O'Donnell Co., Inc., as its distributor in the Boston and eastern Massachusetts district. The O'Donnell organization, in which Robert G. Mearn is a partner, will specialize in products for the construction industry, giving special attention to air, suction, and water hose.

Public Bids Are Resumed On Army Civil Projects

The general policy of formally advertising for and publicly opening bids in awarding civil works construction contracts, as followed before the war, has been resumed with the revival of flood control and river and harbor improvements by the U. S. Corps of Engineers, the War Department has announced.

During the war only civil works projects deemed essential to the war effort were continued by the Army Engineers, with contracts being negotiated on the same basis as military construction contracts.





ADNUN BLACK TOP PAVERS

ADNUN PAVERS were first in the field and have kept the lead where improvements mean dollars saved to road builders. Adnun is the first and only paver suitable for laying slag, soil cement, gravel and crushed rock in addition to any bituminous material—hot or cold. . . . First with a big 6-cylinder, 50 h. p. engine capable of handling the biggest loads on any grade with the positive traction of four-wheel drive. . . . Adnun firsts in operating economy are reported by owners* who have used other pavers, and are a direct result of careful design and long job experience.

Continuous Course Correction, oscillating cutter bar, positive strike-off, lever-adjustment for crown, raker bar in hopper for pugmill mixing and breaking action power cut-off . . . all contribute to fast, accurate laying of smoother finished pavement with minimum subgrade preparation and waste. Any width strip, from 6 to 12 feet, any depth, can be laid with minimum preparation of shoulders or subgrade. One man at the hydraulic controls is the Adnun's working crew

For further details on other Adnun Firsts, ask an Adnun owner, see your nearest Foote Distributor, or write direct.

THE FOOTE COMPANY, INC.

1916 State Street **Nunda, N. Y.**

** Names on request.*

ADNUN

TRADE MARK REGISTERED

BLACK TOP PAVER

WITH CONTINUOUS COURSE CORRECTION

Annual Inspection Of County Bridges

Aerial Photographs, Special Forms for Inspections, and Reclaiming of Graveled Roads Feature Program

By EMMON ROBBINS, County Engineer, Thomas County, Kansas

THE use of aerial photographs to determine drainage areas when new construction of culverts and bridges is planned, and complete annual inspections of existing structures have paid big dividends in Thomas County, Kansas.

Bridges

Thomas County is located in the northwestern part of Kansas, 30 miles from the Kansas-Nebraska line, and 36 miles from the Kansas-Colorado line. The county is 36 miles long, and 30 miles wide, with a population of 6,028 and an assessed valuation of $11,649,272. The land is flat to gently rolling which makes agriculture the principal industry. There are no streams with continuously running water in the county except for a short distance in the northeast corner. The Saline and the Solomon Rivers start in the county but are usually dry water courses.

The bridges are principally Armco Multi-Plate arches with reinforced-concrete footings, wings, and headwalls, of which the County has twenty-four. They vary from one to three spans and have proved very economical to construct and maintain. The rise and span of the arch depend upon field conditions, with the spans varying from 5 to 23 feet. They carry 28-foot roadways and are designed for H-15 loading. Due to the flat country and large areas drained, a coefficient of 0.20 or 0.30, according to Talbot's formula, is used for determining the waterway opening required. This low coefficient has proved adequate.

Most of these bridges and culverts were constructed in 1936 as relief projects. Up to the present time, the bridges have not required any maintenance on the structures themselves, all such operations being on the approaches.

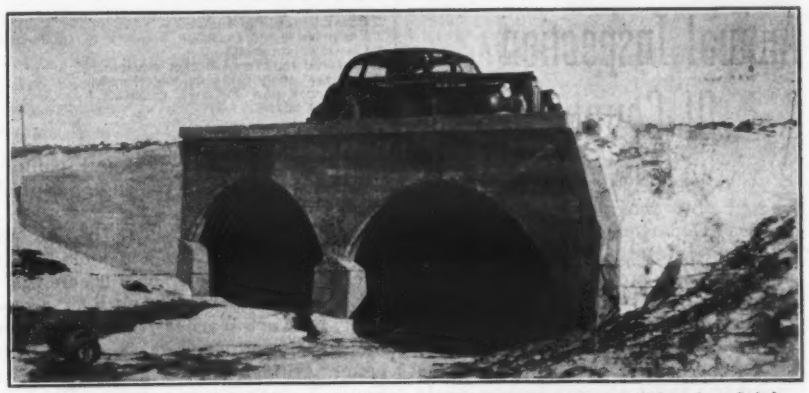
An annual inspection is made of all bridges and culverts, the 1945 inspection and report having been completed in March. The form used is not original but was adapted to meet local requirements.

Each bridge or culvert is numbered according to the highway number, the mile in the highway, and its location to one-hundredth mile. All mile numbers run from the south to the north and from the west to the east. For example, bridge No. 465-12-75 would be on County Highway 465 in the 12th mile and 0.75 mile from the mile corner.

All the bridges and culverts are plotted on a township map to a scale of 2 inches to the mile. On this the actual drainage areas were plotted by the use of aerial photographs. These drainage areas were transferred from the photographs to the maps by a pantograph. This method gives very accurate areas and the contour of the stream. The maps, used with the bridge reports, form the basis of all new construction.

Roads and Maintenance

Thomas County has 166.4 miles of gravel-surfaced highways and 33.6 miles of graded earth roads in the county system. The right-of-way for all highways is at least 60 feet which was established for Thomas County by the State Legislature in 1895. At present there are no paved or oiled roads in the system, but plans have been made to oil some of the roads in the near future. This work will be limited at first to a heavily traveled section of road approximately 1 mile in length. If this section proves satisfactory, the work will be extended later. The operation will then become a yearly item of construction for the main county highways.

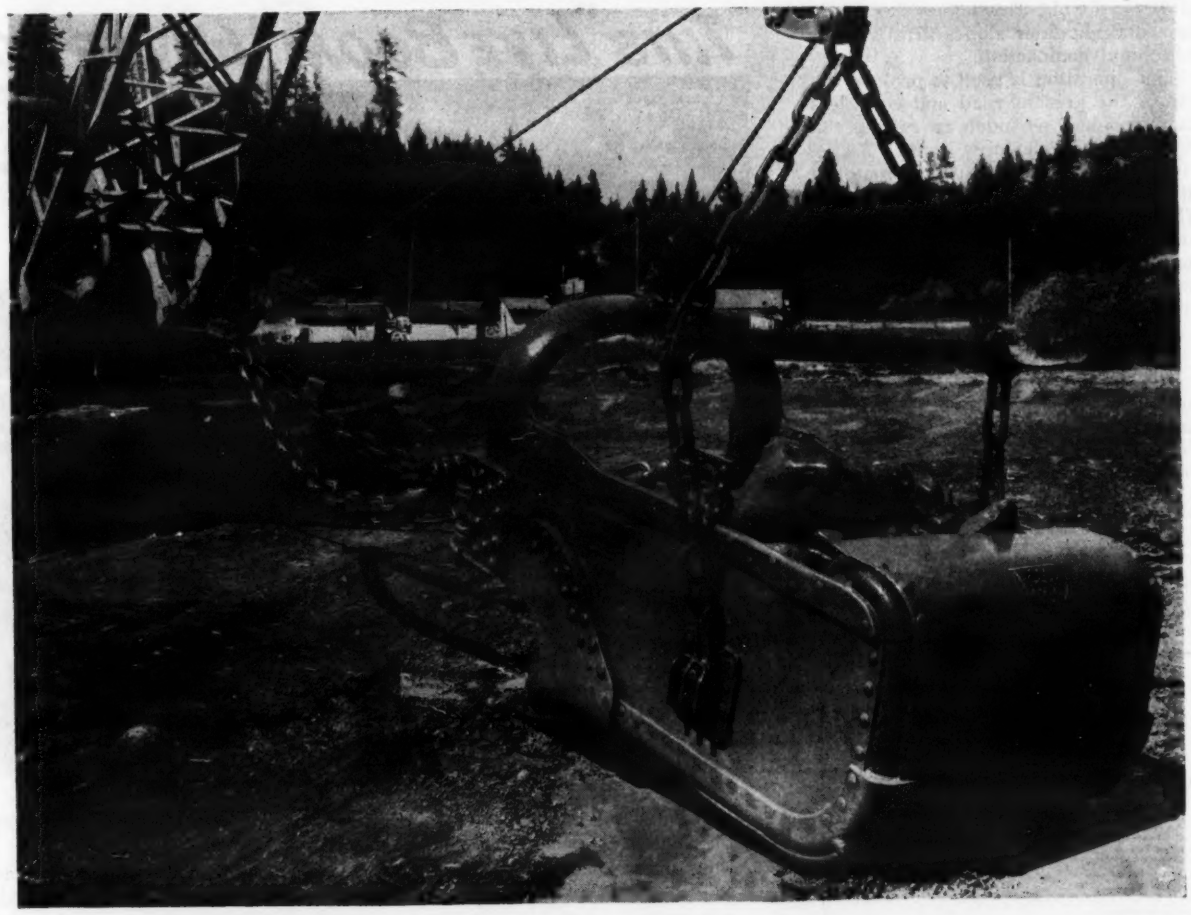


Thomas County has found this type of small bridge economical to build and maintain.

The budget for the County Highway Department for 1945 is $34,000, of which 25 per cent is to be transferred at the end of the year to the Special Road-Building Machinery and Equipment Fund made possible by state law. This law allows the County to transfer not more than 25 per cent of the Road and Bridge Fund each year for the purpose of purchasing new equipment. The funds can be accumulated and used whenever needed. As soon as possible, new motor graders, trucks, and other equipment will be purchased to replace

(*Continued on next page*)

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write for Job Estimate and Literature
COMPLETE
MACHINERY & EQUIPMENT CO., Inc.
Dept. C
36-40 11th St., Long Island City, N.Y.
Tel. IRonsides 6-8600



ESCO ... the strongest-per-pound buckets ever built - - -

That's a pretty strong statement — until you know all the facts about *ESCO's* Stripping and Mining Buckets. First off, *ESCO* Manganese Steel castings are used for all wearing parts, chains and connections. This tougher, shock-resisting, harder-wearing *ESCO* Manganese Steel is placed where needed; excess weight is thus eliminated.

Then, there's design. That's important, too. *ESCO* buckets are designed to *fill quickly*, use a *minimum of power* in loading and, because excess weight is eliminated in the basic design, a *maximum size bucket* can be used on the machine.

And don't overlook *ESCO's* specially designed teeth — that do the actual digging — that save the bucket lip. *ESCO* teeth and lip are correctly engineered for pitch to naturally and positively pull the bucket down into the material— for a maximum bite. May we send you more factual information on the strongest-per-pound buckets ever built? *ESCO* also offers a complete line of dipper buckets. Write for catalogs.

ELECTRIC STEEL FOUNDRY
2141 N. W. 25th AVENUE, PORTLAND 10, OREGON

Offices and Warehouses

SEATTLE, 4 ★ 2724 First Ave. S. Telephone Elliott 4161
HONOLULU, 5 ★ 814 Kapiolani Blvd. Telephone 6486
NEW YORK, 17 ★ Graybar Building Telephone Lexington 28958
SAN FRANCISCO, 7 ★ 699 Second Street Telephone Douglas 8346
SPOKANE, 8 ★ 121 S. Monroe St. Telephone Main 5530
LOS ANGELES, 11 ★ 2700 Santa Fe Ave. Telephone Lucas 7251
CHICAGO, 4 ★ 310 S. Michigan Ave. Room 906 Phone Harrison 5458

Annual Inspection Of County Bridges

(*Continued from preceding page*)

the old ones that are worn out. The Highway Department does not have any indebtedness at the present time, and all operations are on a strictly cash basis.

Only necessary maintenance was carried on during the war, and all construction ceased due to restrictions on machinery and materials and an acute shortage of labor. One operation which has proved very satisfactory and economical in road maintenance is the "pulling in" of shoulders. This operation is not new, but is the usual trimming on a larger scale. On roads with some ditch left and having a wide crown, a motor grader is used to narrow the crown to 26 feet. One operator and a machine can do a mile of road in approximately two days and the profile can be raised from 4 to 8 inches, depending on the amount of dirt available. This leaves the shoulders and shoulder slopes firm without additional compaction.

This operation is used to prolong the life of the present road and costs less than one-half as much as raising the crown with an elevating grader. Gravel is generally used for surface material at the rate of 200 cubic yards per mile. The County reclaimed 11 miles of graveled road by "pulling in" the shoulders in 1944 with excellent results. The accompanying sketch shows the general cross section of Thomas County roads.

Equipment and Shops

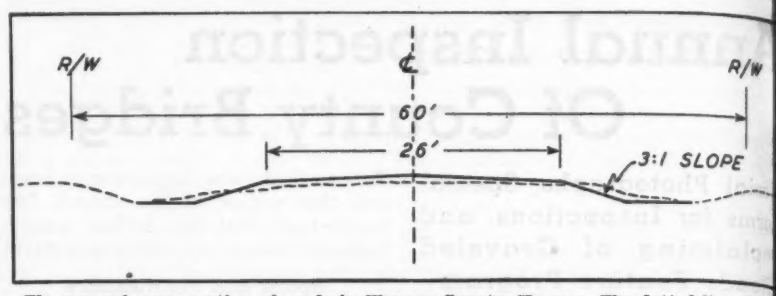
The equipment owned and operated by the County under the direction of the County Engineer includes the following:

1 Caterpillar 42-inch elevating grader
1 Galion 12-foot blade grader
1 International power mower
1 Case power mower
1 Case pull-type mower
1 Caterpillar No. 11 motor patrol
1 Caterpillar No. 112 motor patrol
1 Caterpillar No. 12 motor patrol
1 Caterpillar RD7 tractor
1 Caterpillar D7 tractor
1 LaPlant-Choate C61 scraper
1 Caterpillar D2 tractor with T2 Traxcavator
2 Chevrolet 1½-ton trucks
2 Chevrolet ½-ton trucks
1 Chevrolet automobile
1 Universal rigid-frame bucket elevator
2 Balderson snow plows for motor graders
1 Frink snow plow for truck mounting
2 Concrete mixers
2 Hoists
1 Heavy-duty two-wheel trailer

All county construction and maintenance equipment is serviced in a central shop located in Colby, the county seat. This shop is equipped to handle all types of minor repairs and includes an overhead hoist on a track, air compressor, DeVilbiss paint gun with air regulator, Stewart-Warner Alemite air gun for greasing, a Black & Decker 6-inch bench grinder, a drill stand with a Sioux ¾-inch electric drill, a Black & Decker ⅜-inch electric hand drill, a Hall hard-seat grinder, a Van Dorn valve refacer, a Hein-Werner 2-ton hydraulic floor jack and the usual necessary small hand tools. Major repairs or overhauling is done at local equipment-dealers' shops by their mechanics.

Organization

The county is divided into three commissioner districts, each with a commissioner elected for a term of four years. The present Commissioners include Elmer Goin, Sam Epard, and C. A. Hornery, Chairman. The County Engineer, who is under bond and responsible to the Board of Commissioners for all highway work, is appointed by the Board for a term of one year. The present Engineer has held this position for three years and has been appointed for another year.

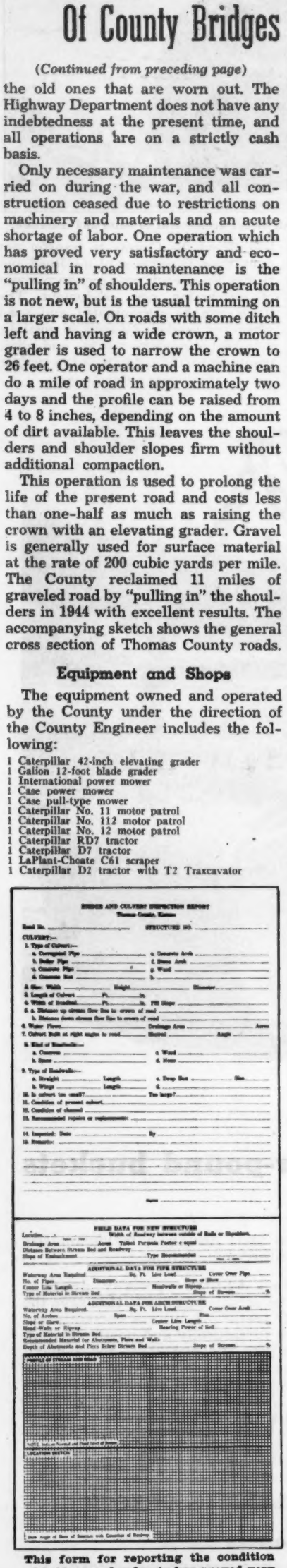


The general cross section of roads in Thomas County, Kansas. The dotted line shows the profile before "pulling in".

All county work is done on a u basis. The Engineer plans the work w the aid of the Commissioners, and inspection trip is made over all cou highways each spring to aid in planni the work to be done. All equipme purchased is used wherever it is need on the highway system and all ope tions are carried out from the cent shop at Colby.

The Commissioners and the Cou

(*Concluded on next page*)



BRIDGE AND CULVERT INSPECTION REPORT
Thomas County, Kansas

Road No. _____ STRUCTURE NO. _____

CULVERT:—
1. Type of Culvert:—
a. Corrugated Pipe _____ e. Concrete Arch _____
b. Boiler Pipe _____ f. Stone Arch _____
c. Concrete Pipe _____ g. Wood _____
d. Concrete Box _____ h. _____
2. Size: Width _____ Height _____ Diameter _____
3. Length of Culvert _____ Ft. _____ In.
4. Width of Roadbed _____ Ft. _____ In. Fill Slope _____
5. a. Distance up stream flow line to crown of road _____
b. Distance down stream flow line to crown of road _____
6. Water Flows _____ Drainage Area _____ Acres
7. Culvert Built at right angles to road _____ Skewed _____ Angle _____
8. Kind of Headwalls:—
a. Concrete _____ e. Wood _____
b. Stone _____ f. None _____
9. Type of Headwalls:—
a. Straight _____ Length _____ e. Drop Box _____ Size _____
b. Wings _____ Length _____ f. _____
10. Is culvert too small? _____ Too large? _____
11. Condition of present culvert _____
12. Condition of channel _____
13. Recommended repairs or replacements: _____

14. Inspected: Date _____ By _____
15. Remarks: _____

Name _____

FIELD DATA FOR NEW STRUCTURE
Location _____ Width of Roadway between outside of Rails or Shoulders _____
Drainage Area _____ Acres Talbot Formula Factor c equal _____
Distance Between Stream Bed and Roadway _____
Slope of Embankment _____ Type Recommended _____

ADDITIONAL DATA FOR PIPE STRUCTURE
Waterway Area Required _____ Sq. Ft. Live Load _____ Cover Over Pipe _____
No. of Pipes _____ Diameter _____ Slope or Skew _____
Center Line Length _____ Headwalls or Riprap _____
Type of Material in Stream Bed _____ Slope of Stream _____%

ADDITIONAL DATA FOR ARCH STRUCTURE
Waterway Area Required _____ Sq. Ft. Live Load _____ Cover Over Arch _____
No. of Arches _____ Span _____ Rise _____
Slope or Skew _____ Center Line Length _____
Head Walls or Riprap _____ Bearing Power of Soil _____
Type of Material in Stream Bed _____
Recommended Material for Abutments, Piers and Walls _____
Depth of Abutments and Piers Below Stream Bed _____ Slope of Stream _____%

PLAN OF STREAM AND ROAD
LOCATION SKETCH

This form for reporting the condition of bridges and culverts has proved very helpful in the maintenance of Thomas County's highway system.

THIS "LIVE BOOM" PAVER LOWERS COSTS

Let's consider the unique advantages of the boom on a standard 34-E Ransome Blue Brute "Dual Drum" Paver to see why you can lay more yardage . . . more accurately . . . with less manpower . . . than with any other paver.

Because this boom is really a "live boom" just like your crawler crane, it can be power-elevated to allow 9 ft. clearance under the bucket. And the paver can be operated *continuously* with the boom in the elevated position.

Think what that means. Whenever you want, or as often as you want, you can concrete retaining walls, abutments, headwalls, etc. in one operation *at the same time you lay the slab.* You eliminate the extra expense of doing those operations separately.

Moreover, because this "live boom" *spreads as it swings* it covers wider area with each batch . . . cuts down on costly hand shoveling.

OTHER BLUE BRUTE PLUSSES

In addition, a Blue Brute "Dual Drum" Paver has the fastest-charging, self-cleaning skip . . . hydraulically-controlled bucket, eliminating split batches . . . metal-to-metal spiral cut-off for precise water measuring . . . mechanically-operated batchmeter for all-season accuracy. These and other features are described in detail in Bulletin 208. Write for it.

24RS-3

KNOW YOUR BLUE BRUTES

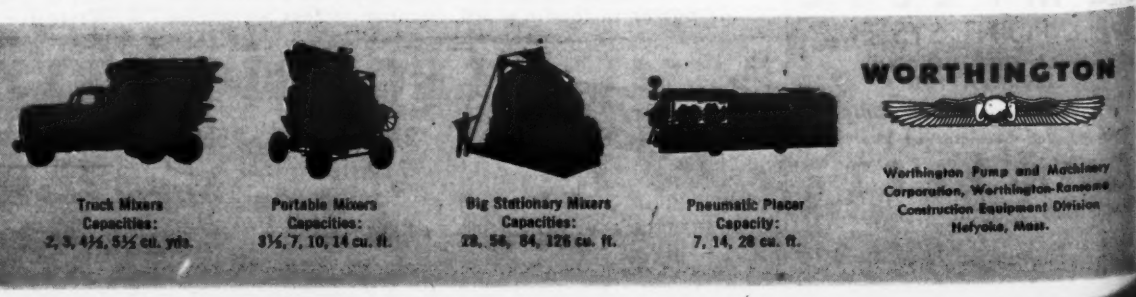
Your Blue Brute Distributor will gladly show you how Worthington-Ransome Blue Brute construction equipment will put your planning on a profitable basis and prove that *there's more worth in Worthington-Ransome.* Act now! His name is listed on page 35. The number beside his name indicates the Blue Brutes he handles.

1.
Blue Brutes include: Pavers, Concrete Spreaders**, Concrete Mixers, Concrete Placing Equipment, Big Mixers, Finishing Machines**, Pneumatic Placing & Grouting Equipment, Truck Mixers, Plaster & Bituminous Mixers, and accessories.

2.
Blue Brutes also include: Diesel, gasoline and electric driven Portable Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs; Rock Drills and Air Tools in a wide range of weights and sizes; Contractors' Pumps.**

**Postwar Products

BUY BLUE BRUTES



Truck Mixers Capacities: 2, 3, 4½, 5½ cu. yds.
Portable Mixers Capacities: 3½, 7, 10, 14 cu. ft.
Big Stationary Mixers Capacities: 28, 56, 84, 126 cu. ft.
Pneumatic Placer Capacity: 7, 14, 28 cu. ft.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

nnual Inspection Of County Bridges

(Continued from preceding page)

gineer are members of the Northwest ansas Highway Officials' Association d the Commissioners also belong to e Kansas County Commissioners' sociation, in both of which they have en active. The author is a member of e Kansas Engineering Society and the ansas County Engineers' Association.

Post-War Plans

The post-war plans of Thomas ounty include the expansion of the rganization by adding a shop mechanic d probably a road foreman, but the eneral overall organization will remain e same. It is also anticipated that the ounty will erect additional storage ace for materials and a shed for the torage of equipment during the winter onths. The shop will continue with me minor alterations and the addition f more maintenance equipment.

Already the County has had 48 miles of highways approved by the State Highway Commission and the Public Roads Administration for planning, but future new construction will be limited to the present county highway system. The proposed work will consist of all necessary grading and drainage structures on a right-of-way of 80 feet. The general specifications will meet AASHO classification D for a 50-mph speed. The highways are to have a minimum width of 28 feet, 3 to 1 shoulder slopes, a ditch width of 6 feet, and a backslope of 3 to 1 where possible. It is planned to have a minimum passing sight distance of 1,400 feet and a minimum non-passing sight distance of 550 feet with a maximum curve of 9 degrees.

All surfacing will be gravel, with the anticipation of some oiling at a later date. The field work has already been started for this construction and it is expected that the work will be let to contract.

About 25 miles of new highway should be added to the present county system to complete a county highway running east and west across both the north and south parts of the county to form connecting links with all of the present highways that run north and south. The existing north and south highways connect with the highways of adjoining counties and pass through every town in Thomas County. The additional mileage would greatly improve the highway system. This program of construction will require several years to complete even with additional equipment and personnel.

Irrigation in Bolivia

Final studies for an irrigation project in the upper Cochabamba Valley of Bolivia will be completed this year, according to the Bolivian press. The construction of five dams is contemplated, with the work to be financed by loans from the Bank of Argentina, the Central and Agriculture Banks of Bolivia, and the Bolivian Development Corp. New hydro-electric installations and water-supply systems may be connected with the project, *Foreign Commerce Weekly* reports.

Worthington-Ransome Blue Brute Distributors

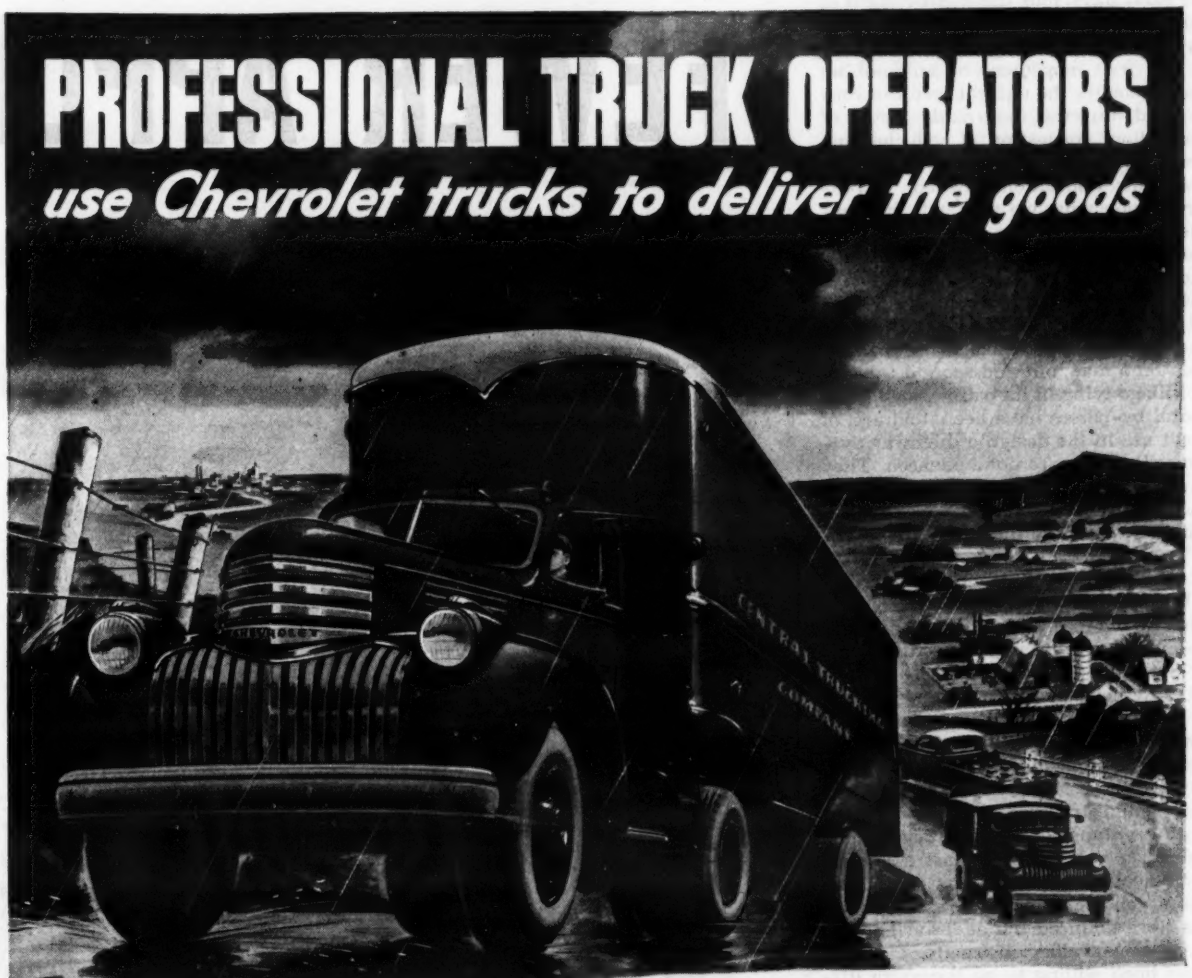
By referring to the advertisement on page 34, you'll learn the meaning of the (1), (2) or (1-2) beside their names.

Ala., Birmingham (1) J. D. Pittman Tractor Co.
Ariz., Phoenix (2) Smith Booth Usher Co.
Ark., Fort Smith (2) R. A. Young & Son
Little Rock (1) Kern-Limerick, Inc.
Little Rock (2) R. A. Young & Son
Calif., Los Angeles (1) Garlinghouse Bros.
Los Angeles (1-2) Smith Booth Usher Co.
San Francisco (1-2) Coast Equipment Co.
Colo., Denver (2) John N. Meade
Denver (1-2) Power Equipment Co.
Conn., Hartford (2) The Holmes-Talcott Co.
New Haven (1) W. I. Clark
Waterbury (1) Contractors Supply Co.
D. C., Washington (1) M. A. Doetsch Machinery Co.
Fla., Miami (1-2) Allied Equip. Inc.
Ga., Atlanta (1-2) Tractor & Machinery Co.
Savannah (1) Morgans, Inc.
Ida., Boise (1-2) Olson Manufacturing Co.
Ill., Chicago (1-2) Chicago Construction Equipment Co.
Chicago (1-2) John A. Roche
Chicago (1) Thomas Hoist Co.
Ind., Fort Wayne (1) American Steel Supply Co.
Indianapolis (2) Reid-Holcomb Co.
Iowa, Des Moines (2) Electric Eng. & Const. Co.
Ky., Harlan (2) Hall Equipment Sales Co.
Louisville (2) T. C. Coleman & Son
Louisville (2) Williams Tractor Co.
Paducah (1) Henry A. Petter Supply Co.
La., New Orleans (1) Ole K. Olson Co.
New Orleans (2) Wm. F. Surgi Equipment Co.
Maine, Portland (1-2) Maine Truck-Tractor Co.
Md., Baltimore (1) Stuart M. Christhilf & Co.
Baltimore (2) D. C. Elphinstone, Inc.
Mass., Boston, Allston (1-2) Clark-Wilcox Co.
Cambridge (2) Field Machinery Co.
Mich., Detroit (1) T. C. Abrams
Dearborn (2) Thomas G. Abrams
Detroit (2) W. H. Anderson Co., Inc.
Flint (2) Gransden-Hall & Co.
Muskegon (1-2) Lakeshore Mach'ry. & Sup. Co.
Minn., Minneapolis (1-2) Phillippi-Murphy Equipt. Co.
St. Paul (1-2) D. L. O'Brien
Miss., Jackson (1-2) Jackson Road Equipment Co.
Jackson (1) Town-Sco Equip. Co.
Mo., Clayton (1-2) The Howard Corporation
Kansas City (1) Brown-Strauss Corp.
Kansas City (2) Machinery & Supplies Co.
St. Louis (2) W. H. Reaves
Neb., Lincoln (1) Highway Equipment & Supply Co.
N. J., Hillside (2) P. A. Drobach
Newark (1) Johnson & Dealaman
North Bergen (2) American Air Compressor Corp.
N. M., Albuquerque (1-2) Bud Fisher Co.
Roswell (2) Smith Machinery Co.
N. Y., Albany (1-2) Milton-Hale Machinery Co.
Buffalo (2) Dow & Co., Inc.
New York (2) Air Compressor Rental & Sales
New York (1-2) Hodge & Hammond, Inc.
New York (1-2) Railroad Materials Corporation
Olean (2) Freeborn Equipment Co.
N. C., Raleigh (2) Carolina Tractor & Equipment Co.
Raleigh (1) Smith Equip. Co.
N. D., Fargo (1-2) Smith Commercial Body Works, Inc.
Ohio, Cincinnati (1-2) Finn Equipment Co.
Cleveland (2) S. M. Clancey
Cleveland (1) H. H. Fuller Equipment Co.
Cleveland (2) Gibson-Stewart Co.
Marietta (2) Northwest Supply & Equipment Co.
Toledo (2) M. W. Kilcorse & Co.
Oregon, Portland (2) Andrews Equipment Service
Pa., Allentown (2) H. N. Crowder, Jr., Inc.
Easton (2) Sears & Bowers
Oil City (2) Freeborn Equipment Co.
Philadelphia (1) Giles & Ransome
Philadelphia (2) Metalweld, Inc.
Pittsburgh (2) Atlas Equipment Corp.
Wilkes-Barre (2) Ensminger & Co.
Wilkinsburg (1) Arrow Supply Co.
S. C., Columbia (1-2) Smith Equipment Co.
Tenn., Knoxville (2) Wilson-Wessner-Wilkinson
Tex., Dallas (1-2) Shaw Equipment Co.
El Paso (2) Equipment Supply Co.
El Paso (1) Mine and Smelter Supply Co.
Houston (2) Dye Welding Supply Co.
Houston (1) McCall Tractor & Equipment Co.
San Antonio (2) Patten Machinery Co.
San Antonio (1) San Antonio Mach. & Sup. Co.
Utah, Salt Lake City (1-2) Landes Engineering Co.
Vt., Barre (1-2) A. M. Flanders, Inc.
Va., Richmond (1-2) Highway Machinery & Supply Co.
Wash., Seattle (2) Star Machinery Co.
Spokane (2) Andrews Equipment Service
W. Va., Charleston (1) West Virginia Co.
Fairmont (2) Interstate Engineers & Constr., Inc.
Wyoming, Cheyenne (2) Wilson Equipt. & Sup. Co.

Bar Bent Beams
Worthington Pump and Machinery Corp.
Worthington-Ransome Construction Equipment Division
Holyoke, Massachusetts

PROFESSIONAL TRUCK OPERATORS

use Chevrolet trucks to deliver the goods



ONE OUT OF EVERY THREE TRUCKS IS A

CHEVROLET TRUCK

Buy Victory Bonds

CHEVROLET

. . . over all kinds of roads—in all kinds of weather—day after day and night after night

Professional truck operators—whose vehicles deliver goods for the nation's business and industry—have but one source of income. That is *the earning power of their trucks.* . . . To meet competition and operate at a profit, professional operators *must* have trucks that combine efficiency and economy. Their trucks must have ample power—to move their loads speedily and smoothly. They must have dependability—to remain on the job day in and day out. *And—above all—they must be low in first cost, low in operating costs, low in maintenance costs.*

Chevrolet trucks provide these essential qualities in correct balance—no one quality over-developed at the expense of another, no one quality skimped. That is why so many professional operators choose Chevrolets . . . why Chevrolet trucks have led all other makes in sales in seven out of the last nine prewar years . . . why one out of every three trucks on the road today is a Chevrolet.

Buy the truck that many professional truck operators buy. . . . Buy the truck that saves you money. . . . *Buy a Chevrolet.*

CHEVROLET MOTOR DIVISION, *General Motors Corp.*, DETROIT 2, MICH.

By-Passing Cities In Different Ways

Do We Want to By-Pass Cities or By-Pass Traffic? Horizontal and Vertical By-Passes Discussed

✦ JOHN Q. PUBLIC and the newspapers he reads still regard cities, from the standpoint of traffic, as obstructions to be by-passed. Apparently the motorist's long-distance journeys make so much more impression on him than the short day-to-day trips that he fails completely to realize the relatively small fraction of traffic that really wishes to get past a city. In the early 1930's, the volume of traffic on state highways had reached a reasonable figure, although still far below the 1941 volume. This increase in traffic from the early days, plus the improvement of rural highways, gradually made it dawn on people that the greatest impediment to the free movement of automobiles was no longer the natural factor of dust or mud, but the man-made factor of congestion, congestion of vehicles and also of pedestrians.

As this realization dawned, we entered upon what we may call the "by-pass era" of highway design, although more explicity it should be called the "horizontal by-pass era", for the by-passes that were then conceived were all in the horizontal plane. Highway engineers merely deflected the road, as seen on a map, out and around the city or village lying in its path. Such horizontal by-passes have been, and are, of great use in the design of highway systems. But they are not a panacea. They have their very appropriate uses, especially in relation to small communities, but they also have their limitations.

What Does "By-Pass" Mean?

We speak of by-passing a city, but what do we mean? Do we not actually mean that we wish to by-pass the *traffic* of the city, the traffic lights and stop signs, vehicles pulling out from the curb or making left turns, jaywalkers and others pedestrians? Motorists have no particular objection to going through a city, or they would have none if only they could traverse the city without getting entangled in its street system. Indeed, a horizontal by-pass generally is of necessity a circuitous route, entailing considerable extra travel. Motorists have endured the additional travel to escape traffic obstructions. They have been willing to go the extra distance, because by so doing they could actually save time by traveling at a higher sustained speed. But from the standpoint of through traffic, it would be more desirable, rather than looping around a city, to go straight through, provided that could be done without entanglement with local traffic.

The public imagination seems not yet to have risen to this concept of getting directly across a city without getting onto its streets. The disadvantage of a horizontal by-pass, the additional travel enforced by a circuitous route, is not, however, the greatest disadvantage such a by-pass has. The greatest disadvantage is that the by-pass route, laid out for through traffic, serves so small a fraction of the total travel that its cost in relation to its benefits is prohibitive.

Importance of Local Traffic

The relative importance of local traffic in comparison with through traffic, first came forcibly to the attention of Connecticut highway officials in 1939, in connection with studies related to the New London-Groton bridge. In 1938 a report was made to the Governor, by direction of the Legislature, on the need of a bridge between New London and Groton. In this report, it was estimated that of the traffic using the bridge 50 per cent would be local and 50 per cent would be through traffic. Considering that New London, on one side of the river, is quite a small city, 30,456 population, and that Groton on the other side is smaller still, 4,719, to assume that local areas could develop half of the traffic using a bridge on U. S. 1 appeared generous, perhaps rash.

Fortunately, in 1939, before the bridge was designed, a more scientific study of traffic in the state was made, including an actual analysis of traffic using the existing New London-Groton bridge. The result was startling. Local traffic, which had been generously assumed to be half the total, was found to be 86 per cent of it. Only one car in seven crossing the river did not have its trip origin or destination in one or the other of the communities immediately adjacent.

Every other study of traffic in urban areas in Connecticut and elsewhere points to this same lesson, that most of the traffic entering a city, even on main roads, does so because it wishes to reach the city, not because it wishes to go past it.

States cannot afford to build a costly horizontal by-pass for a small fraction of the traffic. Conversely and even more importantly, we should do something for the great bulk of the traffic in an urban area which wishes to reach the central business district where it is to work or shop or transact its business, or seek entertainment.

The Vertical By-Pass

Under many circumstances, and very generally in the case of our larger cities, we should plan our by-passes in the vertical plane. We should lay out a road which on the map goes through or immediately adjacent to the heart of the city, but which, on the ground, is found to pass above or below the grid of existing streets. Such a road permits through traffic to pass unimpeded from one side of the city to the other. More important, it permits the much larg volume of traffic desiring access to t city to travel safely, easily, and com fortably, and at a good uninterrupt speed, to a point very close to its de tination before having to leave the e pressway and complete the last stage its journey on the street system.

This article is adapted from a t presented by William J. Cox, St Highway Commissioner of Connecti before the Hartford Rotary Club, Ju 30, 1945, discussing the recent report expressways for post-war construct in the capital city of Hartford whe already there is an excellent exam of a depressed expressway and whe further main arteries of this type a greatly needed.

Farrar of Jeffrey Dies

John X. Farrar, Assistant Secreta and Advertising Manager of the Jeffr Mfg. Co., died suddenly on October 1 at Columbus, Ohio. He had been member of the organization for 32 year

FEWER APPLICATIONS

BECAUSE PROTECTION

USE THE FAMOUS

TEXACO

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS

ongest Bailey Span Built in Netherlands

A 2,600-foot Bailey Bridge has been mpleted across the IJsel River at rolle, Holland, and is the longest span its kind in the world. Named the aple Leaf Bridge in honor of the yal Canadian Engineers who super- ed its construction, this structure rves as a temporary replacement for famous Caterveer Bridge, linking important agricultural northeastern rovinces with the main railroads, and ortening the distance between that rea and western Holland by 62 miles. has a 100-foot main span which was ted into place in one piece by floating anes.

Prior to the erection of the Bailey ridge, all traffic along the main road om the northeast to Amsterdam was bliged to use a one-way pontoon ridge at the site, or equally inadequate es farther south replacing the bridges estroyed by the Germans at Zutphen d Deventer. Now, although wreckage from the old road bridge still presents some obstruction, the 28-foot clearance of the main Bailey span permits ships to pass underneath instead of necessitating opening of the bridge for boats and barges alike, thus greatly accelerating the flow of river traffic.

New Manual on Radial Power-Saw Operation

A new reference guide on the use of radial power saws for all kinds of wood-cutting operations has been published by the De Walt Products Corp., Fountain Ave., Lancaster, Pa. Entitled "How to Operate and Maintain the De Walt Saw", the manual is co-edited by John Stolarz, Sales Manager, and Harry Smith, Service Manager.

The first of the booklet's two parts illustrates and explains the three radial movements of the saw, telling how they can be quickly mastered by the novice. A diagram of a floor plan is included in set-up instructions, as are ways of attaching the extension table, the cut-off gages for dimension cutting, and the dust collector hook-up. Twenty-four popular operations utilizing saw blades, dado heads, shaping cutters, router bits, and other tools are presented. Among operations shown are cut-off, miter, rip, bevel cut-off, bevel miter cut, angle rip, dado, gain, plough, radius cut, flute, groove, tenon, shape, rout, combined cut-off and dado, heel cut on rafters, jointing and sizing, stake cutting, and others. In the second section the mechanical adjustments for controlling and maintaining the accuracy of every setting of the De Walt variety saw are explained.

The manual is available without charge on mention of this notice. Present owners of De Walt saws are asked to forward with their request the model designation and serial numbers of the machine and motor they now possess.

The rubber industry's pre-war capacity of 65,000,000 tires a year has been increased to more than 110,000,000 civilian tires annually.

NS NEEDED...

ON LASTS LONGER WHEN YOU

US CHASSIS LUBRICANT THAT...

★ Resists squeeze-out

★ Seals out dirt and moisture

★ Stays in bearings under all temperatures

TRACTORS, graders, shovels, trucks and other construction equipment last longer, maintenance costs go down, when you lubricate them with long-lasting *Texaco Marfak.*

Marfak is one of the most famous of all Texaco lubricants. It is far more than a mere "grease". This unique product, designed especially for chassis lubrication, is both tough and adhesive. It cushions parts against road shock and clings tenaciously to bearing surfaces despite high speeds, heavy loads and extremes of temperature.

In addition, *Texaco Marfak* has the extraordinary characteristic of forming a fluid film inside a bearing while retaining its original consistency at the outer edges—thus sealing itself in, sealing out dirt and moisture. Its high resistance to squeeze-out means greater protection with fewer applications.

For wheel bearings, the right lubricant to use is *Texaco Marfak Heavy Duty.* It stays *in* the bearings, assuring safer braking. No seasonal change is required.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Carrying the Ball For More Airports

A Worthy Team of Experts Including Industrialists, Engineers and Architects, And Associations Aids Work

✦ THE National Airport Plan formulated by the Civil Aeronautics Administration calls for 3,500 new airports and the improvement of 1,625 existing airfields. This has been accepted by the Congress and now a five-year airport construction program with Federal aid is in immediate prospect. Beyond this, there can be a much greater construction program of smaller aviation facilities, variously called Flight Strips, airparks, and landing strips, for the private planes which will inevitably be a part of the life of the next generation, if not of the present younger generation.

The aviation expert of today predicts that within a very few years there will be 300,000 civilian aircraft in our skies. In 1941 there were fewer than 25,000 civilian planes or one for every 5,200 people. The larger figure would place a plane in the control of one out of every 450 people or a private plane for every 100 families. Just as the automobile increased the demand for smoother all-year highways, so this great flock of man-made birds will demand more landing areas.

The CAA Program

The CAA program of work on 4,675 airfields would involve an expenditure of $1,021,565,945, giving this country a grand total of 6,305 airports at the end of the five-year program. The breakdown of this program into the major items of construction shows:

Item	Estimated Cost	Proportion (Per Cent)
Grading of sites	$ 525,000,000	$1.40
Paving	395,000,000	38.70
Lighting	55,000,000	5.40
Radio	11,000,000	1.10
Miscellaneous	35,000,000	3.40
	$1,021,000,000	100.00

Study of these figures indicates that $920,000,000 or 90.1 per cent of the total expenditure is in the field of construction of the highway contractor, namely, grading and paving. Thus we are assured that we have experienced, reliable, and responsible contractors ready to bid on this work as soon as plans are completed and funds made available.

Keeping the Ball Rolling

Congressional action has stabilized the CAA program but there is still need to stimulate local interest to insure the necessary activity in completing plans and assuring such community financing as may be required. Beyond this, the creation of the local Flight Strip, airpark, etc., is the function of the community to serve its air-minded citizens, so organization is necessary to assure sponsorship of the various projects.

Stimulation of this local interest and action has been undertaken by a widely divergent group of organizations, a few of which will be mentioned specifically here. Their activities have all been on the highest business or professional plane; the great petroleum companies have looked upon it as institutional promotion, assured that each will receive its reasonable share of business; the engineers and architects have prepared their booklets and aids as professional servants of the public; and the great associations which have taken up the promotion of the airport and landing-facility program see in it the growth of industry and an expanding of mass transportation through a new medium.

Among the engineering and architectural organizations which have pre-

(Concluded on next page)

More Airports

(*Continued from preceding page*)

pared booklets or statements regarding airport planning for the use of civic groups and municipal and county governing bodies are Giffels & Vallet, Inc., and L. Rossetti, associated engineers and architects, 100 Marquette Bldg., Detroit 26, Mich., and Fay, Spofford & Thorndike, consulting engineers, 11 Beacon St., Boston 8, Mass. Each of these discusses the growth of passenger traffic, mail, and air express as well as freight, and airport planning and designing.

At least two of the large petroleum-products companies have issued rather elaborate brochures aimed to stimulate community interest in developing adquate facilities to place and keep the city or town on the air map. Under the title "The Airport—Its Importance to Your Community", Shell Oil Co., Inc., 624 So. Michigan Blvd., Chicago, Ill., has issued a well illustrated appeal for making tomorrow's plan today, featuring the development of mass transportation by air, the wide scope of air service to a community, the possibility of several smaller cities developing a single larger airport to serve the group, and concluding with a well conceived program to be followed by a committee, from the selection of the airport site through to the final paving of runways and aprons. A series of full-page topographical maps are reproduced to show various factors which determine the choice of a particular site.

"Community Airports and Airparks" is the title of a booklet offered by Standard Oil Co. of New Jersey, Room 1626, 30 Rockefeller Plaza, New York 20, N. Y., as an outline to follow in establishing facilities for the private flier. The Editorial Review Board of the National Aeronautic Association passed on and approved the contents of this booklet. After developing the thesis of community service facilities for private fliers, the booklet takes up the status of zoning regulations in the various states, the considerations to be given various factors in the selection of expandable and non-expandable sites, soil conditions, drainage, and finally equipment for the airport and sources of revenue therefrom.

The American Road Builders' Association has long been identified with the airport program, and was the first construction group to cooperate with the Federal government in a study and report on the engineering requirements involved in airport construction. Its first work of this nature was carried out jointly in 1930-31 with the Civil Aeronautics Administration's predecessors, the Aeronautics Branch, Department of Commerce, and the American Engineering Council. Realizing the great need for a post-war public and private airport construction program, the ARBA assumed its responsibility in devoting a fair share of its resources to the accomplishment of a continuing airport program on a reasonable and adequate scale. Aeronautical associations usually concern themselves with phases of aviation other than construction, especially the technical features in the design, construction, and maintenance of airports. Through its Airport Division, with a membership including a cross-section of the entire highway and aviation industry as well as educators and others, the American Road Builders' Association has done much to foster the present airport construction program through helpful testimony before Congressional committees and most recently through the excellent 12-page bulletin issued by its Airport Division on the airport situation and program in the United States.

The National Aeronautic Association, 1026 Connecticut Ave., N.W., Washington 6, D. C., is a national organization promoting all phases of aeronautical development and is the organization which does the official timing of planes for speed records. Its greatest activity at present is the extension of its chapters, or wings, throughout the United States. These groups are comprised of individuals interested in aviation, either as fliers who own or are prospective owners of planes, or who are commercially interested in some phase of the great industry developed by aviation, from the manufacture of the plane through its servicing at a local airport. Numerous publications of the National Aeronautic Association are available to those who would develop additional landing facilities within their own community.

Bethlehem's Routh Retires

Stewart B. Brown, a member of the Boston sales staff, has been named to succeed George E. Routh as Manager of Sales of reinforcing bars and construction specialties for the Bethlehem Steel Co.

Mr. Routh, who has retired, was President of the Kalman Steel Co., Chicago, when it merged with Bethlehem in 1931, having been with the Kalman firm since its organization in 1904. First President and long a director of the Concrete Reinforcing Steel Institute, Mr. Routh is also a former director of the Metal Lath Manufacturers' Association, and of the Steel Joint Institute. He was chairman at one time of the research committee on reinforced concrete of the American Iron & Steel Institute.

» » For HOSE
BOOTS, CLOTHING or
PUMP DIAPHRAGMS

Call YOUR *Continental* BRANCH

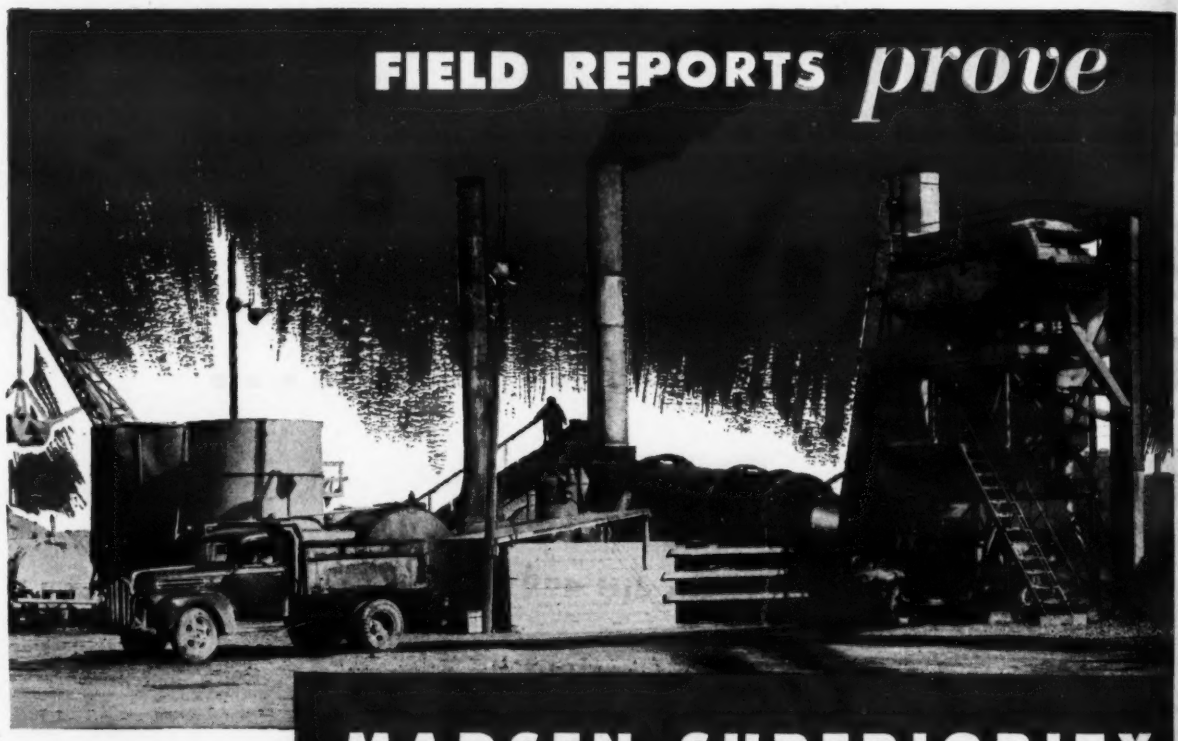
Immediate Delivery from Local Stock

BRANCHES

Baltimore	Indianapolis
Boston	Kansas City
Buffalo	Los Angeles
Chicago	Memphis
Cincinnati	Milwaukee
Cleveland	New York
Dallas	Philadelphia
Dayton	Pittsburgh
Detroit	Rochester
Evansville	San Francisco
Hartford	St. Louis
Syracuse	

See our catalog in Sweet's

CONTINENTAL RUBBER WORKS
ERIE, PENNSYLVANIA, U•S•A



MADSEN SUPERIORITY

OWNERS AND OPERATORS REPORT:

✔ "It is not unusual to mix in excess of 200 tons per hour with our 3,000-lb. Madsen Plant."

✔ "We produced 149,121 tons in 8 months with our 3,000-lb. Madsen Plant."

✔ "We mixed 75,920 tons from October 1 to December 8 with our 3,000-lb. Madsen Plant."

✔ "33,000 tons of asphaltic concrete was mixed by our Madsen Plant in 26 eight-hour days."

✔ "We started in March where we ran 52,480 tons..moved to Nevada where we ran 20,033 tons..moved to Ely where we ran 48,019 tons ..moved to Austin where we ran 28,589 tons..we finished on Nov. 6th running a total of 149,121 tons and could have run more except for early storms."

on every type of Mixing Job

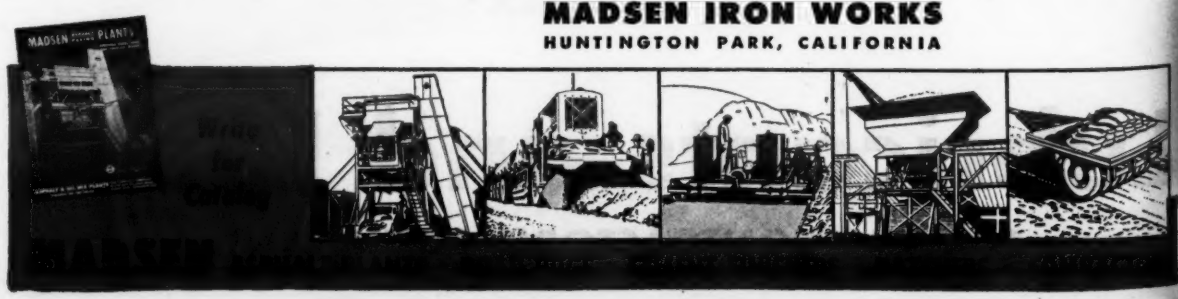
Madsen Asphalt Plants have long been a favorite among Road Builders and Contractors who know the problem of moving from job to job mixing all types of paving materials. The excerpts on the left are typical of the field reports received from these men.

They prefer Madsen because they know the following features which make Madsen Plants faster, better and more efficient: (1) Madsen Pressure-Injection which forces the bituminous binder into the mixer in a spray and quickly coats the tumbling aggregates; (2) The Madsen Pug Mill Mixer which cuts down mixing time and thoroughly incorporates the aggregate and binder to specification; (3) The Unit-Power design which synchronizes every operation to the speed of the mixing—three Madsen-exclusives which assure 30 to 40 more batches per day.

Add Jack Erection which makes transporting from job to job easier and faster as well as the Truckloading Overflow Bin, and many other Madsen exclusives and you'll realize why Madsen Asphalt Plants are preferred by men who know bituminous mixing problems.

Write for illustrated catalog and study all the exclusive features of Madsen 2,000, 3,000, and 4,000 lb. plants.

MADSEN IRON WORKS
HUNTINGTON PARK, CALIFORNIA



New Sanitary Sewers Laid Under Difficulties

Shovels Dig Trenches to Depth Below Sea Level in Wet Sand; Both Sheeting And Wellpoints Used

(Photos on page 1)

ONE of Georgia's fabulous Golden Isles, St. Simons, has recently been benefited by the construction of a new sanitary-sewer system in which nearly 5 miles of vitrified-clay and cast-iron pipe was laid in wet sand, making trench excavation difficult and slow. Since most of the pipe was laid at an elevation below sea level, a wellpoint system was needed for about 90 per cent of the trenching and, in many locations where wide cuts could not be made, sheeting also had to be driven to retain the heavy moist sand. In the beginning, trench excavators were tried but the wet sand proved too hard to handle with this type of equipment, so the bulk of the excavation was done by dragline, backdiggers, shovels, and clamshell buckets.

This project, which also included the building of a sewage-treatment plant, was started in July, 1944, and was completed in May of this year, being financed by the Federal Works Agency. Heretofore this island, 12 miles long and 5 miles across at its widest point, had no sanitary facilities other than those provided by individual property owners, and those consisted of either privies or septic tanks.

St. Simons is one of six large offshore islands along the Georgia coast, and is connected to the mainland at Brunswick by a causeway and bridges spanning three rivers and the marshes of Glynn County. This improvement is a result of the war, since the establishment of Naval air installations and radar training schools on the island and the shipyard expansion on the mainland greatly increased the population, overtaxing the existing sewage-disposal facilities and making the new system imperative. The new facility was provided by the Federal Works Agency from Lanham Act funds and is being leased to Glynn County.

Sanitary-Sewer Contract

A contract for the installation of the sanitary-sewer system was awarded to the Blythe Bros. Co., Inc., of Charlotte, N. C., and excavation was begun with a bucket-type trencher. When this machine proved inadequate to cope with the coarse and fine wet sand characteristic of the island, it was replaced by two Northwest 1-yard Pullshovels for digging. Where the material was very wet, one of these rigs was outfitted as a dragline, while in excavating for the manholes and pumping stations it was found that best results were obtained with a 40-foot boom and a ⅝-yard Kiesler clamshell bucket.

The average depth to which the pipe was laid was 8 feet, but in some locations trenches had to be dug 15 feet below the surface of the ground in order to get the proper gradient in the line. At the pumping stations the excavation went as deep as 21 feet, and for the last few feet of this digging blue marl was encountered beneath the stratum of sand. For the most part, the pipe was laid at the side of the road in order to cause as little inconvenience as possible to passing traffic, and to save the cost of replacing pavement.

Glynn County provided the necessary right-of-way for the sewers and structures whenever the pipe was laid beyond the road or street lines. The average width of trench excavation was between 10 and 12 feet because of the extreme instability of the wet cuts and the need for sufficient space to set up

(Continued on next page)

After excavation had been completed for this one of four St. Simons Island sewage pumping stations, the forms were quickly erected and the steel crew began assembling the heavy bar reinforcing.

It's easier to lift, lower, push or pull the Simplex Way!

Simplex LEVER · SCREW · HYDRAULIC Jacks

for every construction purpose

Awarded the Gold Medal for Safety

Ask for Catalog 44

Templeton, Kenly & Co., Chicago 44, Ill.

FLUID PRESSURE COMPACTION

... with a BROS "WOBBLE WHEEL"* ROLLER

Road or air-field foundations must be evenly and thoroughly compacted to support surfaces that have a low-cost maintenance and lasting utility. They need the fluid pressure compaction of the Bros "Wobble Wheel"* Roller which works and kneads the material together, eliminating voids, and compacts them to a uniform density from top to bottom and from side to side. The rubber tire rollers, low-pressure inflated and with smooth treads, provide a firm and durable foundation—proving once again that "you get the most and only from Bros". Wm. Bros Boiler & Manufacturing Company, 1057 10th Avenue Southeast, Minneapolis 14, Minnesota.

*Copyright 1945, Wm. Bros Boiler & Mfg. Co.

BROS

FABRICATORS OF STEEL • BOILERS • STOKERS • TANKS • ROAD EQUIPMENT

New Sanitary Sewers Laid Under Difficulties

(*Continued from preceding page*)

a wellpoint system which was a "must" in this area.

Wellpoint System

To remove the water from the trenches so that the pipe could be laid in the dry, the contractor used a Moretrench wellpoint system with 3,000 feet of 6-inch cast-iron header pipe. This header line was usually laid on the ground along one side of the trench being dug, with a riser pipe every 30 inches on centers and connected to the header with a swivel joint. The risers were 1½ inches in diameter and came in 14-foot lengths, with one length generally sufficient for the average 8-foot depth of trench. Seven Moretrench pumps were used on the cuts, both for jetting the risers down to position and also for dewatering the ground. The pumps were driven at 1,200 rpm by Hercules 6-cylinder 42-hp engines creating an 18 to 20-inch vacuum in the line. In addition to these pumps on the wellpoint system, the contractor also used three 4-inch double-diaphragm pumps and one 4-inch single-diaphragm pump which were moved about as the occasion required to remove water from the trench.

In many locations it was also necessary to drive wooden sheeting to keep the trenches from caving, even though the water hazard had been eliminated. An Ingersoll-Rand air hammer, powered by an I-R compressor, drove 2 x 8's, 16 feet long, about half their length into the sand on each side of the trench to form a solid wooden wall. About 3 feet above the bottom of the trench on each side a 4 x 8 was nailed to the sheeting for the length of the trench, to which the cross bracing was attached. Assorted lumber, 2 x 4's or 2 x 6's, was placed across the sheeting at 5-foot intervals for cross braces. Cofferdams of similar sheeting were also built for the construction of the manholes, but in building the four pumping stations, which were handled under another contract, cofferdams of steel sheet piling were required.

Laying the Pipe

For the sanitary sewers 62,300 feet of vitrified-clay pipe was used, with diameters ranging from 8 to 18 inches but all in 3-foot lengths. Most of the area is served by 8-inch pipe, with the larger sizes used on the outflow lines. The force mains, totaling 15,008 feet, are cast-iron pipe in 8, 10, and 12-inch-diameter sizes, and came in 12, 14, and 16-foot lengths. Since the largest-size pipe is only 18 inches, no machinery was needed in handling as the workmen lowered the lengths into the trench with rope slings. Where the ground was soft, the pipe was laid on mud sills consisting of two 4 x 4's laid side by side at the bottom of the trench, with a short length of 2 x 4 placed in back of each bell to prevent the pipe from shifting. To prevent uneven settlement, the lumber used was at least 16 feet long.

The joints on the cast-iron force mains were made with Mineralead, while the vitrified-clay pipe joints were sealed with G-K joint compound whenever water in the trench did not prevent its use. Two lengths of the clay pipe were usually joined with G-K heated in a kettle at the top of the trench after which the double section was lowered into the cut. If excess water around the pipe prevented the use of the bituminous caulking agent, the joints were sealed with a cement diaper joint. This latter could be used even if the entire pipe, with the exception of a small area at the top, was immersed in water.

After the joint was caulked with oakum, the diaper joint was applied to the pipe bell and to a short section of the barrel ahead of the joint. The diaper is a heavy two-ply-muslin envelope, stitched along each edge and provided with tie strings of wire, and is long enough to encircle the pipe barrel with enough room left at the top for pouring. A shortage of cloth forced the contractor to improvise other material with which to make the diapers. He managed to buy some old burlap feed sacks from a turkey farm outside of Brunswick and got a colored woman to cut them up, and stitch in the draw strings.

These ersatz diapers were placed around the pipe, and the wires tightly drawn to secure the envelope firmly against the bell and barrel. Through an opening at the top of the envelope the joint was poured full of portland-cement mortar, made of equal parts of cement and sand, thoroughly mixed dry with just sufficient water added so that the mortar flowed freely into the joint space, completely filling it. The mortar was pressed firmly into the joint by hand after the excess water had drained out. The diapers were left in place with their surface smooth and concentric with the pipe barrel, and the tops of the joints were pointed up with mortar.

(*Concluded on next page*)

WINPOWER ELECTRIC PLANTS

NEW POST-WAR MODELS

350 to 35,000 watts A.C. and D.C.

Light, Safe and Portable
Sturdy and Compact in Construction
Modern in Design and Inexpensive to Operate

These models have extremely high output for their size and weight. They are recommended for portable work on road and construction jobs, repair depts., fire depts.; indispensable for lighting and operating of electric tools such as portable compressors, drills, saws, sanders, etc.

Immediate shipment from emergency stock on many models. Wire us your requirements.

WINPOWER MFG. CO., NEWTON, IOWA

Flash — On every competitive test to date, LaPlant-Choate's new 8-yard cable-operated scraper has "run rings around" all other competitive scrapers tested. A limited number are already in the field, with everything set for economical mass production as soon as military conditions permit. You'll agree — it's a scraper well worth waiting for!

THOUSANDS OF SATISFIED OWNERS AGREE

It's LPC for LOWEST POSSIBLE COST

TRADE MARK

There are many good reasons why thousands of successful operators who have been using LaPlant-Choate rigs for years will keep right on buying them after the war. For one thing, these long-time users know from experience that LPC dozers and scrapers consistently move more yardage faster and at lower cost. They also know that LaPlant-Choate performance and dependability have been *job-proved around the world* under all types of conditions. And best of all, these veteran operators know that LaPlant-Choate will continue to lead the way in developing new improvements because LPC's entire organization is *strictly "tractor-equipment-minded"* . . . with more years of specialized "know-how" than any other company in the industry. So it all adds up to LPC—for lowest possible cost and better results—on your jobs, too. See your LPC-"Caterpillar" distributor today. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; San Leandro, California.

ARMY NAVY

LAPLANT CHOATE

EARTHMOVING AND LAND CLEARING EQUIPMENT

THERE IS A JOB-PROVED LA PLANT-CHOATE RIG FOR EVERY EARTHMOVING AND LAND CLEARING NEED

ALL TYPES OF DOZERS— Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.

LARGE OR SMALL SCRAPERS— Hydraulic or cable operated, front or rear dump, for use with your wheel or track-type tractors.

CABLE OPERATED RIPPERS — For ripping up hard ground, shale or concrete to facilitate loading with LPC "Carrimor" Scrapers.

LAND CLEARING TOOLS—A complete line of Brush Cutters, Treedozers, Rootcutters and Brush Rakes—all are interchangeable.

New Sanitary Sewers Laid Under Difficulties

(Continued from preceding page)

Backfilling

Usually not more than a couple of hundred feet of trench was opened at a time so that the excavation, pipe laying, and backfilling were continuous operations. The trenches were backfilled by a Caterpillar Fifty tractor and dozer and an International TD-6 tractor and dozer, and as the sand was pushed from the roadside back into the trench it was carefully tamped by hand under, around, and over the newly laid pipe. The backfill settled well, leaving no surplus material on top of the ground.

River Crossing

Lying east of St. Simons Island towards the Atlantic Ocean is narrow Sea Island, less than 5 miles long and separated from the larger island by Blackbank River. The fashionable resort colony on Sea Island has its own sanitary-sewer system which emptied into the river, but this contract included a connection of the Sea Island system with that of the new layout on St. Simons. With this tie-in, the sewage of both islands is treated at the new plant on St. Simons.

Blackbank River is 320 feet wide and 10 to 12 feet deep with a not too level bottom. In order to lay a force main across this river to carry sewage from Sea Island to the treatment plant, a row of wooden piles was driven at 32-foot spacing across the stream. Driving was done by one of the Northwest cranes mounted on a barge, using a gravity hammer in swinging leads. A dragline bucket was then put on the boom and dragged along the bottom of the river close to the piles, leveling off the river bed so that there would be no deflection in the pipe when it was laid. Twenty 16-foot lengths of 8-inch cast-iron pipe were assembled on barges and lashed to the row of piles by steel cables. The joints in this force main are Molox bolted flanges that have a flexibility of 23 degrees to allow for any possible variations in the bed of the river. The strung-out pipe line was then unloosened from its moorings on the piles and lowered into position on the bottom of the river. This was done with the crane barge moving across the river and lowering the pipe with its boom after releasing the cable moorings.

House Sewers

In installing the house sewers from the mains to the property lines, approximately 15,000 feet of 6-inch vitrified-clay pipe was used. On the deeper mains, the Y's were turned straight up and vertical stacks of 6-inch pipe encased in brick were used to within 5 feet of the surface. During this period the water table rose to such a height that it seemed that some of the laterals would have to be sheeted or well-pointed or both.

Blythe Bros. devised a novel scheme of meeting this problem by using a 4-inch Domestic double-diaphragm pump as an excavator. An open-end box 4 feet square was placed in the hole when water and running sand were reached. A hose was placed in the box beside the suction hose of the pump and, by adding more water, the pump was able to pump out both water and sand, the box sinking to the desired elevation in a very few minutes. The box held the opening long enough for the connection to be made and protected.

Sewage Works

The other contract on this project was awarded to the Espy Paving & Construction Co., of Savannah, Ga., and included the construction of four underground pumping stations requiring the building of steel pile cofferdams; a primary sewage-treatment plant with pumping station, bar screen, mechanical clarifier, sludge tanks, chlorine treatment tanks, and drying beds; and about ½ mile of electric power line. The effluent from this new sewage plant now empties into Dunbar Creek which is a tributary of the Frederica River, the western boundary of St. Simons Island.

Quantities and Personnel

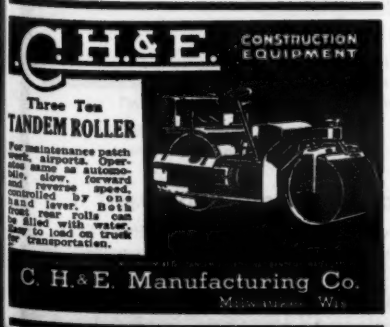
The major items in the sanitary sewer project were as follows:

Vitrified-clay pipe,	8-inch	35,132 lin. ft.
" " "	10-inch	1,400 lin. ft.
" " "	12-inch	7,225 lin. ft.
" " "	15-inch	781 lin. ft.
" " "	18-inch	17,762 lin. ft.
Y's for service connections		1,890
Manholes		196
Drop manholes		19
Cast-iron force main,	8-inch	9,983 lin. ft.
" " "	10-inch	1,420 lin. ft.
" " "	12-inch	3,605 lin. ft.

As the sanitary sewers laid in this contract extended only to the property line of the land owners, connections to the houses were made by the individual landlords. The cost of the entire project was $431,895, with the Espy Paving & Construction Co. contract amounting to $161,931, and the Blythe Bros. Co. contract totaling $269,964. On this latter sewer-laying work, a force of 80 men were employed under the supervision of Superintendent R. O. Lay. C. G. Gaston was Project Engineer for the Federal Works Agency, and J. P. Baskin was Resident Engineer for Wiedeman & Singleton of Atlanta, the consulting engineers. The application for assistance from the Federal Works Agency was made by the Commissioners of Roads and Revenues of Glynn County, H. J. Friedman, County Engineer-Director. In charge of construction operations for the County were A. M. Fairly, Jr., Assistant County Engineer, and Wiley Goff, Superintendent of Public Works.

Heintz Joins C. S. Johnson

The appointment as General Sales Manager of J. H. Heintz, sales and construction engineer identified with the construction industry for 25 years, has been announced by the C. S. Johnson Co., manufacturer of concrete plants and material-handling equipment at Champaign, Ill. Engaged in airport construction in Florida and Central America during the war, Mr. Heintz operated his own business for 12 years prior to 1941.



GALION

MOTOR GRADERS—ROLLERS

GALION ROAD MACHINERY points to better roads

THE GALION IRON WORKS & MFG. CO.

Main Office and Works: Galion, Ohio

Distributors in Most Large Cities

The Marion W-K spreader is designed for use in ice control, as well as for distributing sand or gravel in road construction or maintenance.

One-Man-Operated Feeder and Spreader

Operated by the driver of the truck, a combination feeder and spreader capable of covering an area 40 feet wide at 5 mph is available through the Marion Metal Products Co. The device replaces the tail-gate on any standard dump truck, and is powered by direct drive from the left rear wheel of the truck. A sprocket attachment drives an auger located across the lower edge of the tail-gate. The auger, in turn, feeds the material to the center of the gate, where it is directed onto a centrifugal spinner by chutes. All cohesive material is broken up by an agitator mounted directly above the auger. The spinner, which remains level at all times, is constructed to throw the material being spread back and downwards. Constructed of welded sheet metal, this Marion W-K spreader is easily removed. However, the truck load can be dumped without doing so.

Model A, the standard type for ice control, is capable of spreading gravel, cinders, sand, salt, calcium chloride, and Nos. 4, 6, 7, and 9 stone. Model B, a heavy-duty unit, is for agricultural lime, etc. An illustrated folder may be secured from The Marion Metal Products Co., Marion, Ohio.

Standard Oil of Indiana Promotes Robert Nerem

Robert Nerem has been appointed Superintendent of the Sales Department's construction engineering, at Standard Oil Co. (Indiana), Chicago, Ill., succeeding J. A. Parks who retired recently after 28 years of service. Mr. Nerem, a graduate of the Norwegian Institute of Technology, joined the organization as a draftsman in 1926, and in 1936 was made Assistant Superintendent. He will be succeeded in that post by R. A. Niles, who has been transferred from South Bend, Ind.

The RIGHT Answer to EVERY VIBRATOR PROBLEM in the Concrete Construction Field!

JACKSON VIBRATORY Equipment

Stick this in your hat for future reference: For each and every purpose to which Vibrators are applicable in the concrete industry, we can supply the equipment that will give you not only the best and fastest placement, but also the maximum of dependability and trouble-free service. Our long famous JACKSON line includes many vibrators of both the internal and external type; the finest equipment available for:

General Construction ★ Light Construction ★ Mass Concrete ★ Hard-to-get-at Places ★ Form Vibrating ★ Floors, Streets and Highways ★ Pipe Manufacturing ★ Movement of Materials ★ Vibratory Tables, etc.

If you have a Vibrator problem, by all means let us show you how to solve it to best advantage. Drop us a line. No obligation, of course.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

It doesn't take an Expert to sharpen those Dull Rock BITS with the Pacific GRINDING JIG

It's just as simple as it looks! Mount the grinder on a bench, table, or any level surface, and even a novice can start immediately to sharpen all makes of four-way bits up to 3 inches in size . . . Dull bits only waste time and money, so why not do as hundreds of modern operators are doing . . . use a PACIFIC Grinding Jig and always have a reserve supply of SHARP bits on hand?

Ask for Details

ALLOY STEEL & METALS CO.
1862 East 55th Street, Los Angeles 11, California
Manufacturers of PACIFIC SLUSHING SCRAPERS & SHEAVE BLOCKS • PACIFIC CRUSHING & SCREENING UNITS • PACIFIC ROCK BIT GRINDERS • PACIFIC ALLOY-MANGANESE MILL LINERS & CRUSHER JAWS • PACIFIC TRACTOR RIMS, CRAWLER SHOES & Wearing Parts

LACLEDE HIGHWAY STEELS

WIRE MESH
Slab reinforcement keeps cracks closed and holds slab together.

DOWEL SPACERS
Assures correct alignment and simple installation of shear dowels.

CENTER JOINT
For controlling longitudinal cracking of pavement.

Specify Them!!

REPORTED HIGHWAY RESEARCH INDICATES STEEL REINFORCEMENT IS NECESSARY IN PAVEMENTS FOR LONG LIFE AND LOW MAINTENANCE.

LACLEDE STEEL COMPANY
ST. LOUIS, MISSOURI

Well Tooled Shops For Equipment Care

Large Plant at Raleigh Services Road Machinery Used in North Carolina; Machine Shop Modernized

By WILLIAM H. QUIRK,
Eastern Field Editor

ONE of the largest and best outfitted shops in the south for maintaining and repairing highway equipment is found at the Central Equipment Depot of the North Carolina State Highway and Public Works Commission 2 miles west of Raleigh, N. C. Built between 1922 and 1924 on a tract of land covering 30 acres on the north side of U. S. 1 and 64, the plant consists of eight buildings where maintenance-of-equipment operations are carried on, and four other building used for storage.

Although North Carolina has shops located in each of the ten divisions into which the 100 counties of the state are divided, together with usually three district shops to each division, most of the major maintenance of equipment is done at the Raleigh Central Depot. The importance of the Depot increased greatly during the war inasmuch as the Highway Commission was using old road equipment for the most part, being unable to purchase new machines.

The Commission now has in service 163 pick-up trucks more than 7 years old; 305 1½-ton trucks more than 7 years old; 167 4-wheel-drive trucks more than 10 years old; 128 motor graders more than 9 years old, some of which have been in use 14 years; and 92 road graders more than 11 years old.

Since January 1, 1942, it has been necessary to junk 168 passenger cars; 80 ½-ton pick-up trucks; 479 1½-ton trucks; 46 larger-size trucks; 41 crawler tractors; 34 motor graders; 56 pull-type graders; and various other items of equipment. Parts were taken from these discarded units to use in equipment still being operated, while much of the equipment remaining has either been rebuilt or repaired in this shop.

Stock Building

The Central Depot furnishes parts and supplies to the division shops, and has an inventory valued at $325,000 for this purpose. The division shops themselves carry from $35,000 to $80,000 worth of parts and supplies. A total of 6,300 different items are stored in the stock room at the Central Depot in a long rectangular-shaped building, 200 x 50 feet, constructed of concrete blocks with a concrete floor and a corrugated-metal roof supported on steel trusses. A card file lists every piece of equipment owned by the Highway Commission, indexed according to license number. Such equipment is identified by the letter H preceding the number, and the first number after the letter indicates the division to which that particular machine is assigned; H-6056 would mean that the equipment bearing that license number is in use in Division 6. This card also contains such information as make and type of machine, motor or engine number, and the Commission's own number for the machine.

A perpetual-inventory card system lists the 6,300 different items carried in stock, shows at all times the number of pieces of each item on hand, and the bin number where that part is stored. These wooden bins, painted gray, run the length of the building, with the first row of bins marked with the letter A and each bin in that row given a number. When the alphabet was exhausted, double lettering was used from AA to ZZ followed by the bin number.

When the division shops need supplies, they mail an order to this main stock room where it is filled and either shipped or sent out by truck. On the stock-room floor are ten large wooden boxes, 3 x 2 x 1½ feet deep, numbered for each division, into which parts and supplies are gathered during the filling of an order.

Machine Shop

Alongside the stock room is the machine shop, a steel-frame and truss building with corrugated-metal walls and roof and a concrete floor, well lighted on all sides through translucent glass windows. An amazing amount of shop equipment is worked in this 120 x 40-foot building, some off belt drives and the rest by individual motors. Originally two overhead line shafts ran the length of the building, each powered by a Westinghouse 20-hp motor, and to which practically all the machines were connected by belt drives. Now the shop is being modernized by substituting electric motors to drive each machine. Already enough individual motors have been installed to eliminate one of the two motors driving a shaft so that the two line shafts are now driven by one Westinghouse 20-hp motor, located overhead, a connection between the shafts being made at each end with a 10-inch belt.

This changeover was initiated because of the difficulty in obtaining the belting necessary to operate the equipment off the line shafts, and also for purposes of economy and efficiency. Belting costs about $1 a foot, which item will practically be eliminated in the new system. Then too, instead of keeping the whole system running all day

(*Continued on next page*)

C. & E. M. Photo

The North Carolina Central Equipment Depot at Raleigh consists of eight well equipped shops for maintenance operations, and four storage buildings.

TOUGHEST* OF THEM ALL IS

Caine CORR-PLATE Steel Piling

*POUND for POUND!

In its weight class, it's the champ!

And here's why! The corrugations give it strength far beyond what you'd expect from its weight! There's nothing like Caine *Corr-Plate!* It's actually a cold rolled section . . . rolled similar to other steel shapes, but on special machines . . . the only ones of their kind!

Corr-Plate is made to order for those thousands of in-between piling jobs. It eliminates the waste of using needlessly heavy piling on hundreds of jobs where, heretofore, only excessively heavy piling was considered strong enough.

If you've got a piling job where use of Caine *Corr-Plate* is indicated . . . you're missing a bet if you don't use it!

AVAILABLE IN ANY LENGTHS

Standard Interlock

Used the world over for building Foundations, Dams, Retaining Walls, Docks, Levees, Bulkheads, and thousands of other construction jobs, Sewers and Disposal Plants.

Investigate NOW

these and many other time-proven reasons why THOUSANDS OF ENGINEERS AND CONTRACTORS SWEAR BY "CAINE CORR-PLATE"

1. Easier to transport. (Nestable)
2. Easier to handle and set.
3. Easier to drive.
4. Easier to pull without distortion.
5. Easier to use over and over again.
6. Easier to set under existing structures.

Write for FREE Catalog

CAINE Steel Company

STEEL PILING DIVISION
1820 N. Central Avenue
CHICAGO 39, ILLINOIS

Well Tooled Shops

(*Continued from preceding page*)

long when only a few machines may be operating, as is the case in using the belt drives, the smaller economical-to-operate motors will be used only when the machine itself is being operated. Motors have been installed two and three at a time as they could be obtained; half the shop equipment is now operated from individual motors, while the remaining half is belt-driven off the line shaft.

The long side of the shop runs north and south, with the main entrance through a 12 x 12-foot overhead door in the center of the west wall. At the right of the entrance is a Kwik-Way cam grinder with a 6-inch swing, operating from two G-E ½ and ¼-hp motors. To the south along the west wall, there is a Brown & Sharpe gear-hobbing machine which will cut gears up to 18 inches, driven by a Westinghouse 5-hp motor. Alongside is a shop-made hob grinder which can grind gears up to 15 inches. Hand tools are stored in long low wooden cabinets, 8 feet long x 2 feet wide x 3 feet high, which are close to the wooden work benches, 7 feet long x 3 feet wide, with sheet-metal tops. In the southwest corner of the shop are an Ammco babbitting jig, and a Davis 12-inch x 4-foot lathe, with the line shaft driving a dc generator which operates a dc motor on the lathe. Three emery stands are also located here, powered by a U. S. Electrical dc generator and motor.

Northward in the adjacent aisle are a Prentice 16-inch x 5-foot lathe, with belt drive; a Landis bolt-threading machine, with a capacity up to 1 inch, and also belt-driven; a ¾-inch drill press with its own motor; a rivet-bushing grinder, and a Becker 4B vertical miller, each of which is awaiting delivery of an electric motor. In this section also are a cast-iron layout table, 6 x 4 feet x 4 inches thick, and a Lempco cylinder-boring bar.

Overhead in this shop is a well balanced system of hoists consisting of two Yale 2-ton and a Yale ¼-ton hand-operated hoist, and two electric hoists, a Yale ¼-ton and a Budgit ⅛-ton.

More Heavy Equipment

Along the west wall north of the main entrance are a Heald cylinder grinder with belt drive; a 16-inch x 3-foot Diamond belt-driven surface grinder used chiefly for grader blades; a 7½-inch x 30-inch Fitchburg cylindrical grinder, with belt drive; and a Norton 18-inch x 5-foot crankshaft grinder operated by a 7½-hp Century motor. In the northwest corner of the room is a G-E 15-kw 125-v 120-amp dc generator, driven by the line shaft, which in turn operates dc equipment around the shop, such as eight grinders, two lathes, and a magnetic chuck.

Along the north wall is a battery of lathes including a Davis 12-inch x 4-foot machine, operating on dc current; a 14-inch x 4-foot belt-driven Rockford; a 12-inch x 3-foot belt-driven Reed-Prentice; a 16-inch x 7-foot belt-driven Hendey; a 14-inch x 8-foot belt-driven Reed-Prentice; and an 18-inch x 6-foot lathe driven by a Lima 3-hp motor. In this group there is also a Lapointe broaching machine driven by a 10-hp G-E motor, for cutting keyways and splines.

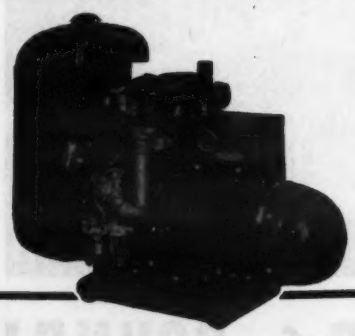
Southward along the east half of the shop are located a Bridgeford belt-driven 24-inch x 4-foot lathe; a Mogul Metallizer which builds up crankshafts by spraying them with molten 0.25 carbon steel; a LeBlond 16-inch x 5-foot belt-driven lathe; a Colburn 48-inch heavy-duty boring mill which acts like a vertical lathe and is operated by its own 20-hp G-E motor; a motor-driven American radial drill press with a capacity up to a ¾-inch hole; a belt-driven Mueller radial drill press, with 4½-foot radius, which will take a 3-inch drill; an Acme power hack saw with a 12-inch blade; a belt-driven Baker drill press, with a 3-inch drill; and a Cincinnati 20-inch shaper.

In the south half of the shop along the east wall and in the central section is more heavy equipment, including belt-driven Brown & Sharpe No. 1 universal tool grinder with an 8-inch swing and 30 inches between centers; a LeBlond 21-inch x 6-foot lathe driven by a Lima 5-hp unit; two drill presses ¾-inch size, with belt drive; a belt-driven Putnam 36-inch x 10-foot lathe; a Gorton No. 3S profile machine used in making dies or duplicating pieces, and driven by a 1-hp G-E motor; a No. 1 Cincinnati milling machine, with belt drive; a No. 1 Cincinnati milling machine, geared to a 1-hp Lima motor; a Whitney No. 6 milling machine, with belt drive; a Warner & Swasey belt-driven No. 4 turret lathe; a 2¼-inch x 26-inch turret lathe, with belt drive; a Becker No. 4B vertical miller, now waiting for its own motor; an Atlas No. 5 hand-operated compound mandrel press; and two Greenerd No. 3 arbor presses.

Water Supply

East of the machine shop is the pump

(*Continued on next page*)



ELECTRICITY

For All Contracting and Engineering Projects

• ONAN ELECTRIC GENERATING PLANTS supply reliable, economical electric service for engineering and contracting uses as well as for scores of other general applications.

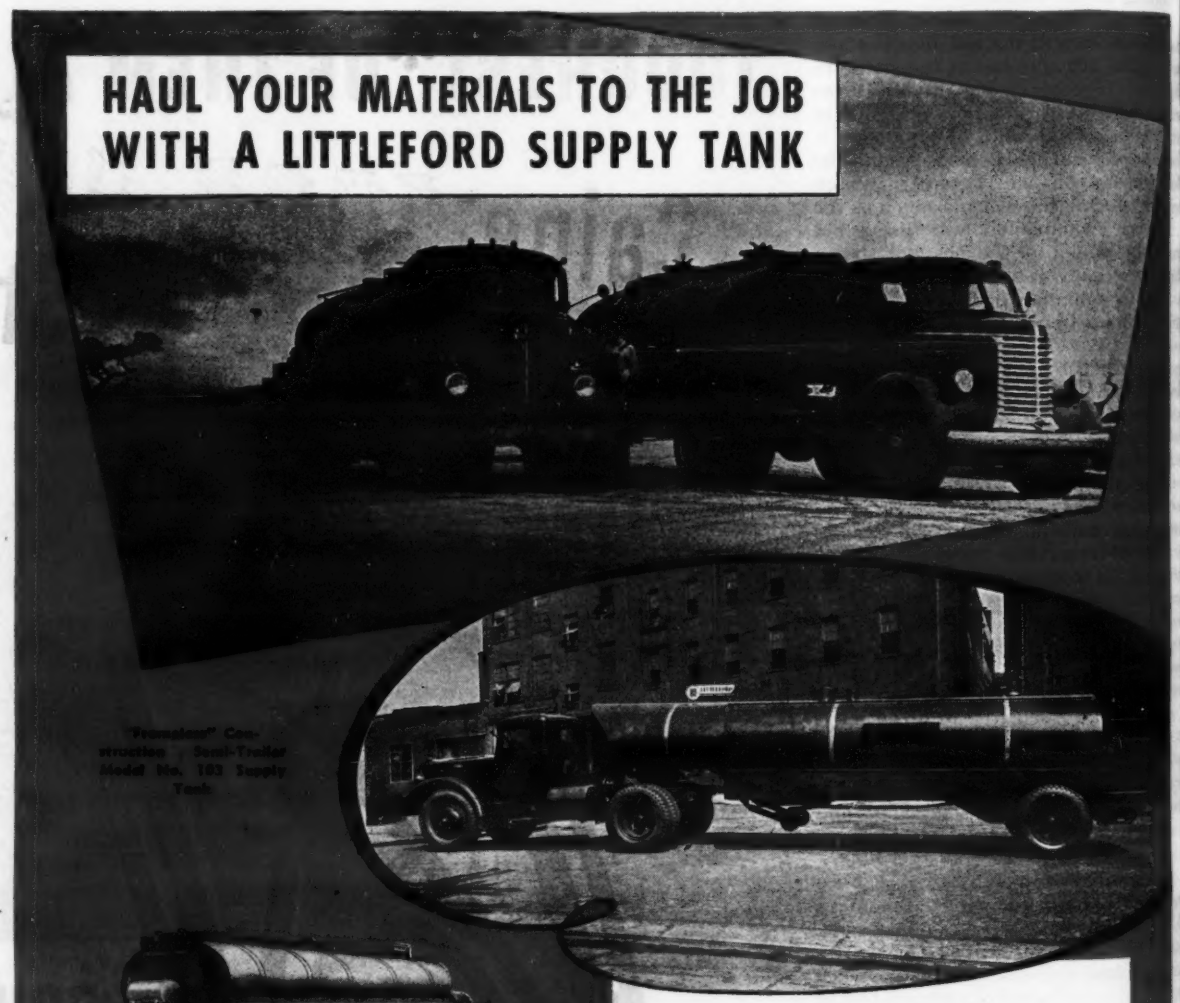
Driven by Onan-built, 4-cycle gasoline engines, these power units are of single-unit, compact design and sturdy construction. Suitable for mobile, stationary or emergency service.

Models range from 350 to 35,000 watts. A. C. types from 115 to 660 volts; 50, 60, 180 cycles, single or three-phase; 400, 500, and 800-cycle, single-phase; also special frequencies. D. C. types range from 6 to 4000 volts. Dual voltage types available. Write for engineering assistance or detailed literature.

D. W. ONAN & SONS
3451 Royalston Ave.
Minneapolis 5, Minn.

ELECTRIC PLANTS Onan
POWER AND LIGHT FOR EVERY NEED

HAUL YOUR MATERIALS TO THE JOB WITH A LITTLEFORD SUPPLY TANK



"Pneumatic" Construction Semi-Trailer Model No. 103 Supply Tank

Model No. 102

Model No. 103

When on those big Bitumen Spraying Jobs, keep the Pressure Distributors at work by doing the hauling in a Littleford Supply Tank. Let the Supply Tank operate from the tank car or storage tank to the job.

These Supply Tanks speed up Highway Construction or Maintenance, make it possible to save hours of time.

Littleford Supply Tanks are made in Two Wheel, Four Wheel, or Truck Mounted Models, with Heating Systems or without. Semi-Trailer Frameless Construction Supply Tanks, Models No. 102 and No. 103 are standard. This is the Tank without the Trailer feature, an exclusive Littleford Feature.

Get ready for those big Black Top Road Construction jobs by having your Littleford Supply Tanks ready to work.

LB LITTLEFORD
BLACK TOP ROAD MAINTENANCE EQUIPMENT
SINCE - 1900

LITTLEFORD BROS., INC.
485 E. Pearl St., Cincinnati 2, Ohio

C. & E. M. Photo
North Carolina recently improved the steel storage room at the Central Depot by laying a reinforced-concrete floor. A CMC mixer delivered the concrete to wheelbarrows.

Well Tooled Shops

(Continued from preceding page)

room, beneath which is one of the three deep wells which supply the Central Depot with water. This room contains an F. E. Myers deep-well plunger pump with an 18-inch stroke, connected by a V-belt drive to a G-E 10-hp motor. Water is pumped to a 90,000-gallon tank centrally located in the yard.

North of the machine shop and across the spur-line track of the Seaboard Railway which enters the Depot is a small 20-foot-square building of corrugated metal which houses a 1910-model city fire engine, which in past years was pulled by horses through the streets of Raleigh. This boiler, once operated by steam, now is filled with compressed air through a connection to the main air compressor of the Depot. Outside the building is a fire hydrant to which the pump is connected, the water being supplied from the reservoir tank. A nearby storage tank, 18 feet long x 6½ feet in diameter, containing air at 90-pound pressure, acts as a receiver on the line. Within one minute of an alarm of fire, water under pressure can be turned on through hose which are reeled on portable rubber-tired carts.

A 30 x 40-foot corrugated-metal building to the east of the old fire-engine boiler contains a sign-painting and broom-making shop. Painting is done by hand.

Boiler House

West of the fire-control building is the boiler house, 50 x 30 feet, where two coal-burning boilers are located. The main boiler, which supplies steam heat to all the buildings, is a 60-hp horizontal locomotive-type unit, while a smaller vertical 30-hp boiler furnishes steam and hot water for cleaning equipment and parts. In this room is a tank, 5 x 4 x 4 feet, where an Oakite solution is prepared for cleaning machinery.

Blacksmith Shop

Further north is a large corrugated-metal building, 40 x 300 feet, where blacksmith work and welding are done, and old oil reclaimed. At the south end of this building, which has its long dimension running north and south, the blacksmith shop is located. Equipment includes a Billings & Spencer trimming press used for trimming signs, and two oil-burning furnaces where temperatures up to 2,000 degrees F can be produced for case-hardening metals. One furnace is 26 x 16 x 24 inches in size, while the other is 40 x 48 x 20 inches. Steel blocks up to 15 inches square are cut on two cold saws driven by a Westinghouse 15-hp motor. Compressed air for the Depot is supplied by a 20-year-old National Brake & Electric Co. compressor, with a capacity of 300 cfm at 90-pound pressure, driven by a Westinghouse 220-volt 865-rpm 136-amp 54-hp motor.

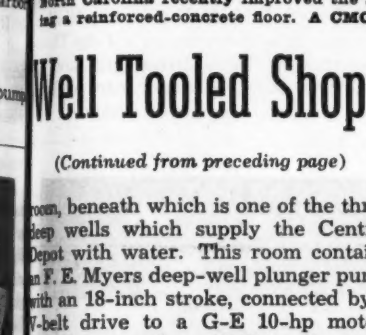
Some ponderous equipment is worked in this blacksmith shop, including a 600-ton hydraulic press with a 24-inch ram that travels 18 inches. The U. S. Army authorities from Fort Bragg used this piece of equipment to press out several thousand boggy wheels for their half-tracks. Running off the air compressor is a Niles-Bemet-Pond steam hammer with a 10 x 6-inch head traveling through a 16-inch stroke. A 4-foot-diameter circular forge and a Southwark steel cutter, with a capacity up to 1 inch, complete the equipment.

To the rear of the blacksmith shop but in the same building is the steel storage room, and behind that is the welding shop which is equipped with a Hobart 400-amp electric welder as well as acetylene cutting and welding units.

Oil Reclamation

The northern end of this building is given over to oil reclamation. Used and dirty oil from all over the state is brought to this location in drums hauled by trucks and is emptied into a 1,000-gallon underground tank just to the east of the building. Alongside the tank, but

(Continued on next page)



THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD

ALL STEEL HAND HOIST

SEATTLE, U.S.A.

The Biggest Little Hoists in the world for use where power is not practical, available, or sufficient.

2-Ton "Lightweight"	75 ft.	1/5"
5-Ton "General Utility"	250 ft.	1/5"
15-Ton Triple-Geared "Special"	1200 ft.	1/5"

With patent gear change and positive internal brake that never fails, and will lock load.

Gear Ratios	Weight	Price
2-Ton 4 & 22 to 1	60 lb.	$ 50
5-Ton 4 & 24 to 1	110 lb.	75
15-Ton 4, 19 & 109 to 1	680 lb.	250

BEEBE BROS.
2724 6th Avenue So., Seattle 4, Washington
Dealers in all Trade Centers

GAR WOOD ROAD MACHINERY

"One Man Gang"

Here's efficiency! One man, one tractor, a Gar Wood Hydraulic Bulldozer in front and a 2-Wheel Scraper behind, handle practically any earth moving job, quickly and economically.

GAR WOOD ROAD MACHINERY
WITH ALLIS-CHALMERS DIESEL POWER

For Top Efficiency Use Gar Wood Road Machinery. That's a rule with many leading contractors and County Road Authorities. A large number of them began with a Gar Wood combination such as that shown above—found it superior on the job—ordered more units. As a result, the present volume of orders is the greatest in Gar Wood's history. Place your orders now with your Allis-Chalmers dealer.

GW ROAD MACHINERY is Sold Through ALLIS-CHALMERS Dealers Everywhere

ROAD MACHINERY DIVISION
GAR WOOD INDUSTRIES, Inc.
DETROIT 11, MICHIGAN

OTHER PRODUCTS OF GAR WOOD INDUSTRIES INCLUDE HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

Well Tooled Shops

(*Continued from preceding page*)

at a lower elevation, are two 10,000-gallon railroad tank cars into which the old oil is forced by compressed air. After the oil has stood in the first car for a day or two, the water and refuse have settled to the bottom and are drained off into a nearby ditch. Then the oil is forced along by air into the next car where this process is repeated. The remaining oil next flows by gravity through a 2-inch line into a 500-gallon tank in the building.

From here the dirty oil is pumped, 55 galloris at a time, into a Youngstown-Miller oil purifier where 35 pounds of Retrol clay is added as a cleansing agent. The oil is then heated to a temperature of 460 degrees F in an upper tank on the machine, and forced by air through twenty-six paper filters into a lower tank with a capacity of 225 gallons. Dirt as well as the clay is removed by these filters, and after standing overnight to cool the oil is drawn off, sent to the laboratory for testing, and labeled. A grade of oil between SA-20 and 30 is secured in this processing which reclaims an average of 80 per cent of the old oil that is returned. The machine averages 200 gallons a day. The dirty drums are washed out with steam, filled, labeled "reclaimed oil", and returned to the division from which they came.

Heavy-Equipment Assembly

West of the blacksmith shop and north of the boiler house is a 60 x 120-foot corrugated-steel building where heavy equipment is assembled. Suspended from the steel trusses are seven 2-ton Yale hoists which cover the entire area. Three 12 x 12-foot doors admit the largest type of machinery that can be sent here for assembly. Welding is done by a Hobart electric welder driven by a Studebaker-8 engine and made portable by a mounting on four rubber-tired wheels.

Other equipment includes an 18-inch x 6-foot lathe with a 3-hp Lima motor; a power hack saw with a 12-inch blade driven by a G-E 1-hp motor; a 2 x 16-inch emery wheel driven by a G-E 2-hp motor; a Bignall & Keeler pipe-threading and cutting machine that can take up to a 3-inch pipe; a G. A. Gray heavy-duty planer with a 36-inch swing with four heads, two vertical and two horizontal, working on a 12-foot table, and powered by a Westinghouse 10-hp motor; a 10-foot metal roller with three 9-inch rollers driven by a Westinghouse 10-hp motor; a drill press with a capacity up to ¾ inch; and two machines operating off a Westinghouse 3-hp motor, a Barnes drill press up to 1½-inch size, and a hydraulic wheel press.

West of this building is a 50 x 60-foot paint shop equipped with DeVilbiss spraying equipment, and where an old air hammer has been rigged as a paint mixer.

Main Shop

The largest building in the Central Depot is the main shop with a length of 234 feet along the north side of the main highway and a width of 135 feet extending to the north. This building, like the others, is of steel construction, is well lighted with windows on all sides, and has 12 x 12-foot doors in the north and east walls. Twelve coal stoves augment the steam heating system. In the northwest corner is the office of the shop foreman, adjoining which is a 12 x 24-foot room where fuel-injection pumps for diesel engines are repaired. Immediately to the south is a 20 x 40-foot magneto room where generators, starters, and magnetos are repaired and electrical parts are stored. This section has fluorescent lighting and is equipped with a South Bend 9 x 24-inch lathe; an Allen tester for electrical equipment; and a Sun unit for motor testing.

Along the north wall of the main shop, cars and trucks are tested on a Balance-Master wheel aligner, while along the south wall heavy trucks are repaired, and in the middle bays light trucks and passenger cars are serviced and rebuilt. The shop is equipped with Hunter - Hartman portable battery chargers whereby a battery can be charged overnight without removing it from the car, and also has Unitron rectifiers. In the southwest corner of the building are two Hoefer drill presses, a metal-breaking machine, and two Wright & Corson brake-lining machines. Among the other duties of this shop is making bread pans for use in prison camps all over the state.

Equipment used in the south half of the building includes a Kwik-Way valve reseater; a Sunnen piston-pin grinder; a 12-foot engine breaking-in stand on which can be tested two rebuilt engines, one at each end, with an electric starting motor in the center and a gas tank on top to supply fuel to the rebuilt gas engines during the testing period; a 25-ton hydraulic press; and a track-pin press for repairing crawlers on tractors.

Welding is done in the southeast corner with Linde Oxy-Acetylene sets and with a Hobart 300-amp electric arc welder. Several Sioux 10-inch emery wheels are conveniently placed near the 3 x 10-foot work benches which line both north and south walls.

Heavy lifting in the shop is done with nine 2-ton Yale hoists which roll overhead to any part of the repair area. Eight Blackhawk 4-ton floor jacks are available, while to the left of the north entrance is a 7-foot-lift hydraulic floor jack. Greasing is done with Lincoln portable units which can be plugged in to many conveniently located air outlets. A small air compressor is used for inflating tires.

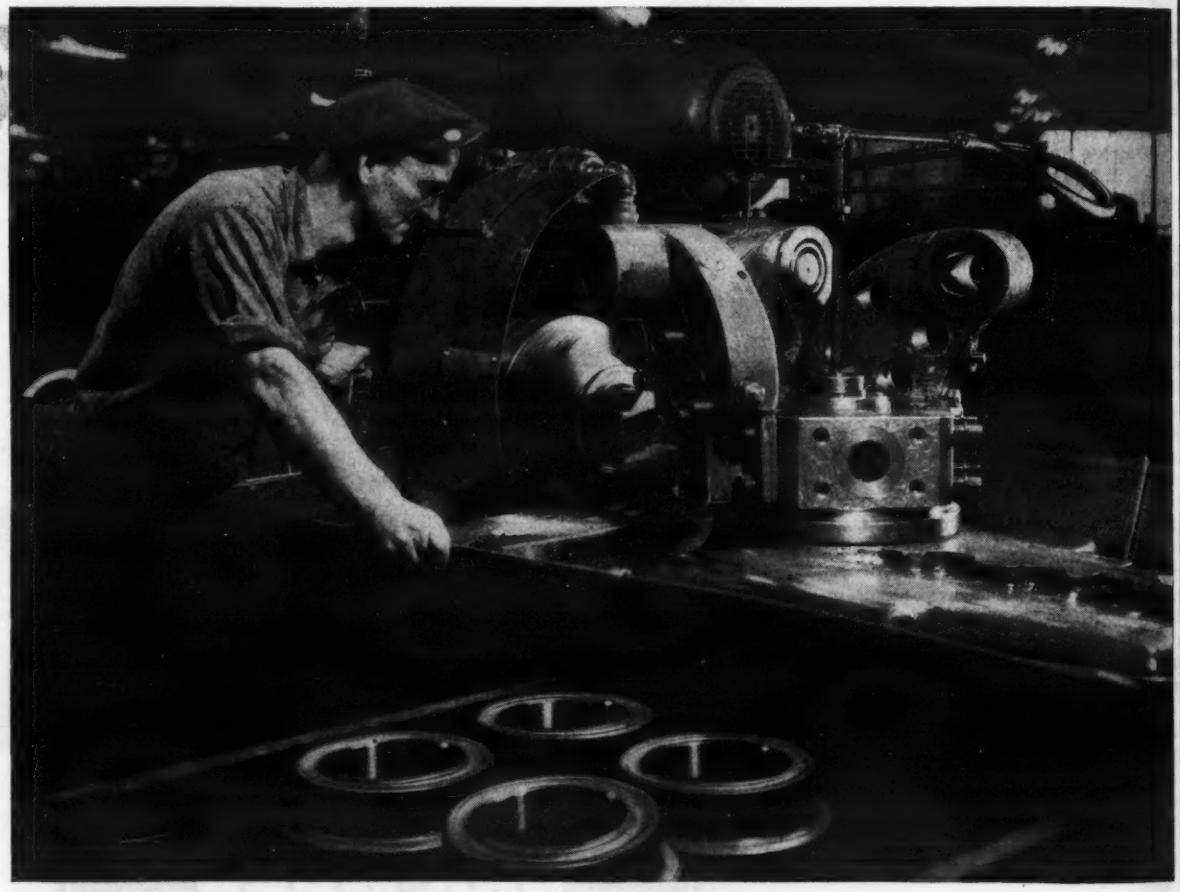
Each division shop as well as the main one has a truck crane to send out on the road for hauling in damaged or broken-down equipment which cannot come in under its own power. Two a in use here: a Chevrolet truck with 12-foot boom in the rear with a capaci of 5 tons, and an old Model B FW truck, used by the Army in the fi World War, equipped with hard rubb tires, and a 14-foot boom with an 8-t capacity.

Cushion and upholstery work for ca and trucks is done in an area along t north wall, with a Singer sewing ma chine used for heavy stitching.

Carpentry Work

The northeast corner of the big build ing is given over to carpentry wo with a lot of diverse equipment inclu ing a 30-inch Fay & Egan planer drive by a 5-hp G-E motor; a 10-inch x 3 foot Walker-Turner lathe driven by 1-hp motor; a chain mortiser driven b a 5-hp Westinghouse motor; a rip sa driven by a 5-hp G-E motor; a Walke Turner rip saw driven by a 1-hp Drive motor; a Walker-Turner jig saw; a American No. 2½ turner run by thre

(*Concluded on next page*)



Boring lower track wheels to .002 tolerance using Carbide tools in the Oliver "Cletrac" plant.

We hold an "edge"!

The use of Carbide cutting tools in boring our lower track wheels . . . tools that will hold their cutting edge at higher operating speeds . . . is one reason why Oliver "Cletrac" tractors hold a big "edge" in quality.

Typical of the modern production methods in the Oliver "Cletrac" plant, this cost-cutting boring operation permits us to build in added quality, in materials and workmanship, without added cost to you. Highly skilled Oliver "Cletrac" craftsmen plus the most modern equipment combine to maintain the standard of *extra* quality that is characteristic of every Oliver "Cletrac" tractor.

Maintenance of that standard enables your Oliver "Cletrac" dealer to offer you the finest in crawler tractors . . . for your every need.

CLETRAC

a product of

The OLIVER Corporation

Well Tooled Shops

(Continued from preceding page)

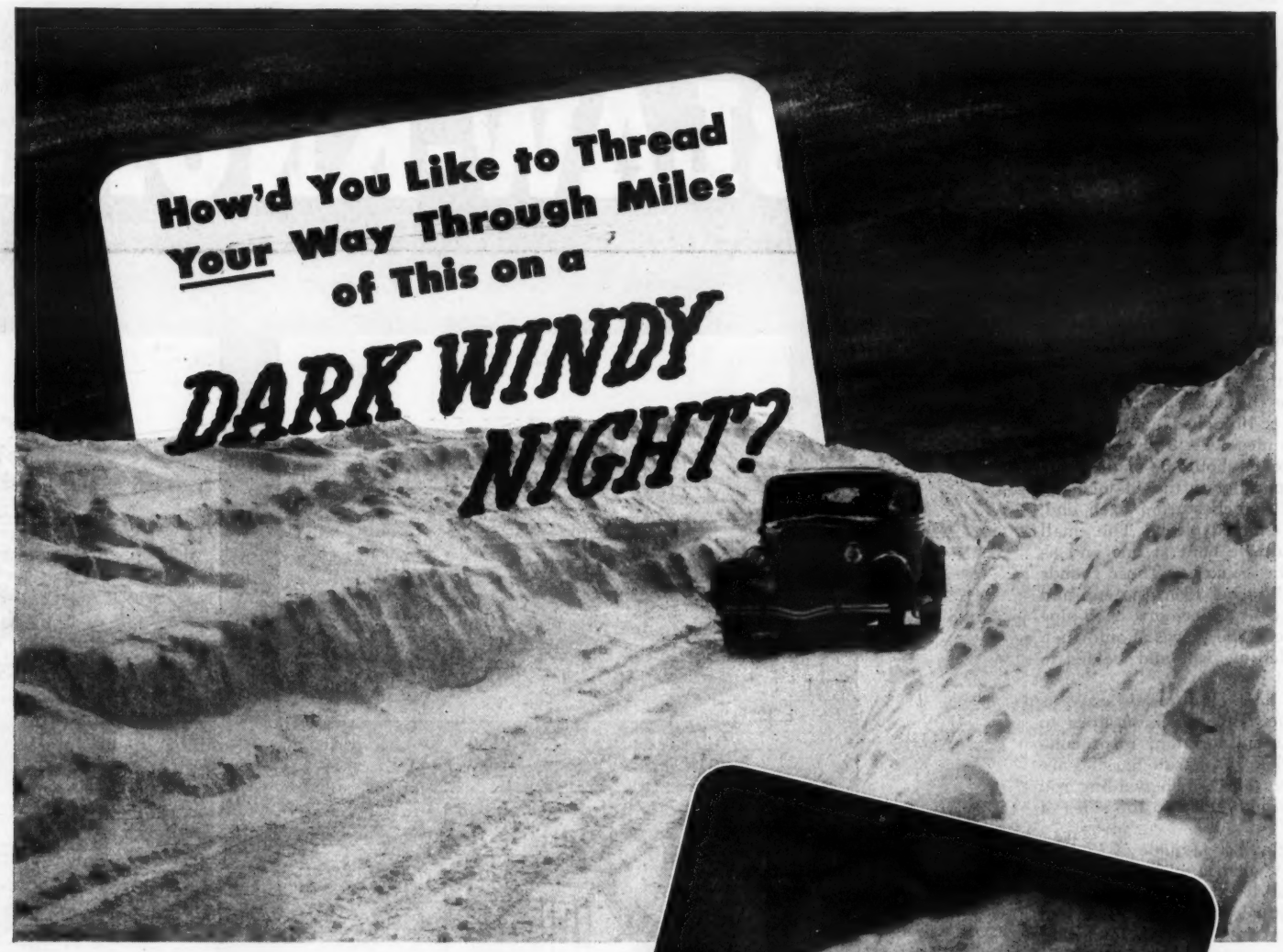
tors of 1-hp each; a 12-inch jointer iven by a 1-hp motor; a 24-inch ing saw, 32 feet long, with nine roll- s driven by a 3-hp motor; a 24-inch ill press driven by a 1-hp motor; a -inch cut-off saw driven by a 2-hp otor; a 36-inch band saw driven by a -hp motor; a Black & Decker 8-inch nch grinder; and a 3 x 30-inch grind- g stone driven by a 1-hp motor.

Most of the carpenter-shop equip- ent is 15 to 20 years old, and is used r such work as building refrigerator ailer trucks to carry meat from pack- ing houses to prison camps, water tank trucks, and prison cages with heavy wood and metal bars to be fitted on pick-up trucks. In a 50 x 30-foot wooden shed to the east of this shop heavy lumber work is done on an 8 x 24-inch American planer, driven by a 25-hp G-E motor.

In addition to these buildings there are, in the spacious yard, four large storage sheds all 50 feet wide and with lengths of 180, 200, 220, and 300 feet. These sheds have corrugated-steel roofs on steel trusses and it is proposed to lay concrete over the greater part of the unpaved floors of these structures. The steel storage room in the blacksmith shop was recently paved with an 8-inch reinforced-concrete floor by a gang of 10 convict laborers, plus a free-labor foreman and concrete-mixer operator. A CMC 3-bag mixer using a 1:2:4 mix, and wheelbarrows for carrying the sand, stone, and concrete comprised the equipment used in this work. Two layers of 6-inch-square mesh, one 2 inches from the bottom and the other 3 inches from the top, reinforce the 35-foot-square area paved. The coarse aggregate is ¾-inch stone, with sand for the fine aggregate. A 2 x 6 was used as a screed and, after leveling off, a dry mixture of 2 parts sand and 1 part cement was thrown lightly over the top of the concrete and floated with a long-handle float to give a smooth finish.

Personnel

A force of 85 employees have recently been at work in the North Carolina Central Equipment Depot where before the war twice that number were used. Hal Tharington is Superintendent, and H. C. Gillis, Machine Shop Foreman. This shop, as well as the division shops, is under the direction of S. C. Austin, State Equipment Engineer, with W. Vance Baise, State Highway Engineer for the North Carolina State Highway and Public Works Commission.



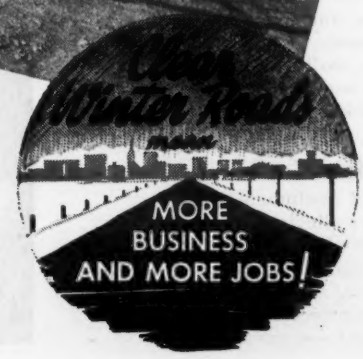
DANGEROUS isn't it? Every intersection is a menace, every curve a threat! Single lane traffic, high banks that blow across your vision, hide intersection markers. Compare it with the wide clean Snogo cleared road below. Here winter traffic can proceed safely even at high speeds. Plenty of room for passing, plenty of time and visibility for intersections

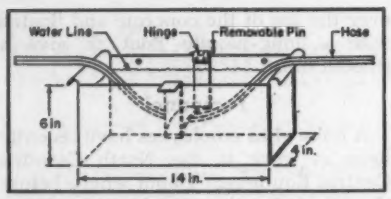
Snogos were cutting these banks down when these pictures were taken, throwing the snow into the fields where it cannot blow back on the road. Note how Snogo cuts right into the bank and throws the snow away. It won't "crowd out" as does a "V" type plow.

Snogo is the answer to safer, open winter roads. There is a size for every budget; a size for every job. Let us tell you about Snogo and how it is serving states, counties, cities and airports all over the country.

KLAUER MANUFACTURING COMPANY
Dubuque, Iowa

SNOGO A SNOGO For EVERY BUDGET





This portable tank for testing oxygen and acetylene hose lines can be quickly made of sheet metal welded together. With it, hose lines can be tested right on the job.

Welding-Hose Test Tank Is Easily Made

Oxygen and acetylene hose lines should be tested regularly, and any leaks should be repaired at once. This well known rule of economy and safety is sometimes neglected because hose lines, cylinders, and water in a suitable container cannot be easily and quickly assembled in a convenient place for testing. If ready means for making such tests are available, the operator soon forms the habit of testing at frequent intervals.

The details of construction of a portable hose-testing tank are given in a recent issue of *Oxy-Acetylene Tips*. The tank can be made of almost any light-gage sheet metal welded together to make the joints waterproof. The suggested dimensions, as shown in the sketch, are 14 inches long, 4 inches wide, and 6 inches deep. It is preferable to make the sides and bottom of one piece, 14 x 16 inches, and each end of a separate piece, 4 x 8 inches. Two right-angle bends should be made in the large piece, parallel to the 14-inch dimension and 6 inches from each end, forming a U-shaped piece. The small sections should be bent at one end as shown in the sketch. These bends should start 2 inches from the end and can be made over a piece of 1-inch pipe held in a vise. The pieces should then be tack-welded in place and welded to the sides and bottom.

The rolled ends of the tank serve as smooth surfaces for the hose lines to slide on and, in addition, form convenient handles. If separate handles are desired, pieces of ¼-inch welding rod can be bent and welded to the sides of the tank.

A submerging bar is made of ¼-inch strap iron, 1½ inches wide. It should be bent so that it extends down into the tank for a distance of 4 inches. One end should be bent to a right angle so that it rests on one side of the tank. The other end should be welded to one half of a small hinge from which the pin has been removed. The other half of this hinge is welded to the tank wall so that the submerging bar may be held in place by inserting the pin through the two halves, as shown in the sketch. Two holes drilled in the back of the tank are convenient for hanging it on the wall when used in the shop. When the tank is completed, the edges can be smoothed by a file.

In using this tank, it should be filled with water to about 1 inch from the top. The hose lines are placed over the tank lengthwise and the submerging bar is set in place and locked with the removable pin. The hose lines can be pulled through the tank, or the tank can be moved along the lines to within a few inches of the regulator gages. The remaining few inches can be tested with soapy water when the connections with the regulators are tested.

Since the tank can easily be carried about when filled, hose lines can be tested on the job quickly and easily.

Cuban Public Works

Recent purchases of equipment from the United States have alleviated somewhat the delay in completion of public works projects in Cuba, *Foreign Commerce Weekly* reports. Appropriations for new public works projects amounting to $1,040,000 have been made.

Funds to Reactivate Public Works Sought

On October 17 the President of the United States asked Congress for funds to pay for the completion of 171 Federal projects in flood control, navigation, and reclamation, costing a total of $221,842,000, of which $128,475,000 is for work to be done under the direction of the Army Engineers, and $93,367,000 under Bureau of Reclamation contracts. Much of this work was either halted or deferred by the war.

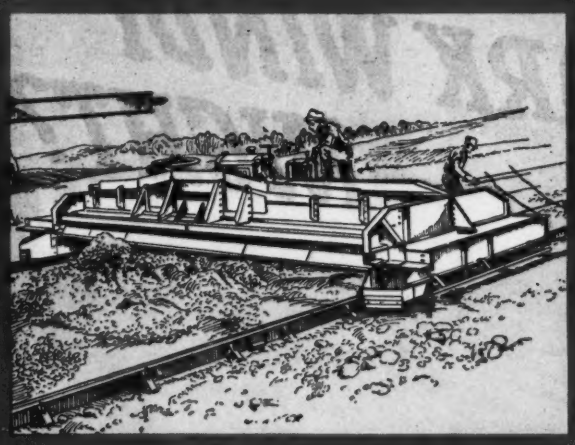
In flood control there are 32 projects, the start of which was deferred; 25 on which work will be resumed; 31 new projects to be completed by 1948; and 29 others that would take longer to complete. There are also 23 navigation and 31 reclamation projects.

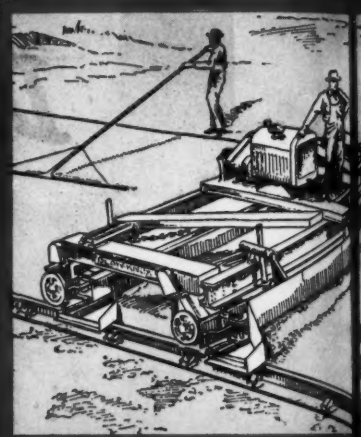
Four New Distributors Named by Osgood-General

The appointment of four new distributors of their construction, excavating, and materials-handling equipment has been announced by the Osgood Co. and the General Excavator Co., both of Marion, Ohio. They are: General Machinery Co., Spokane, Wash., which will provide sales, maintenance, and warehouse service in the Inland Empire region; American Equipment Corp Harrisburg, Pa., serving several Pennsylvania counties; The Carl R. Mille Tractor Co., Des Moines, for the centra Iowa district; and a Canadian firm, J. S Innes, Ltd., Leaside, Ont., serving east ern Ontario.

Among equipment being readied b the two firms are the General Typ 10 one-man-operated one-engine-pow ered all-purpose unit mounted o pneumatic tires, and the Osgood Typ 100, a 2½-yard shovel, dragline, clam shell, and crane. The new ⅜-yard Os good Type 5 will be a full-revolvin machine with a complete range o front-end attachments.

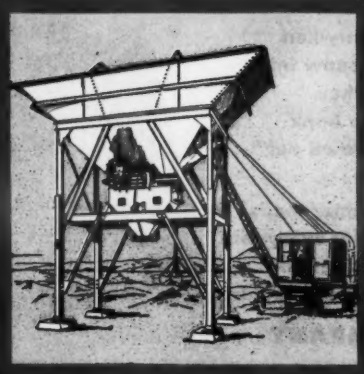
BLAW-KNOX HAS E ANSW S T

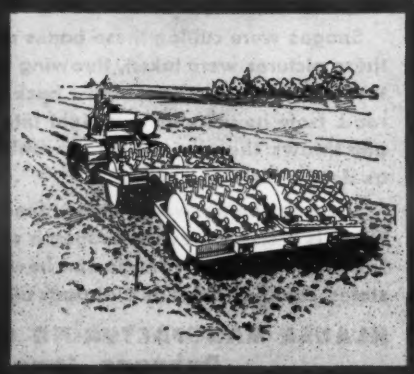

PAVING SPREADERS FOR ROADS AND AIRPORTS


FINISHING MACHINES FOR ROAD IRPORT

TRUCK MIXER LOADING PLANTS

STEEL STREET FO


AGGREGATE BATCHING PLANTS


SHEEPSFOOT TAMPING ROLLERS

BULK CE ANTS

Tracks and Rubber On Today's Dirt Jobs

In selecting track-type or wheel-type tractors for specific job requirements, three general zones of earth-moving must be recognized, the Caterpillar Tractor Co. points out in a recently issued brochure, "Today It's Tracks and Rubber". Each zone of earth-moving has certain distinct requirements that make one type of equipment more suitable than the other.

Discussed and illustrated in the 12-page booklet are the power, the slow-speed, and the high-speed hauling areas. Recommendations are made as to the type of tractor for use in each case. Selection of equipment to provide the utmost in operating efficiency and economy is urged.

Readers may receive copies of this brochure without obligation by writing direct to Caterpillar Tractor Co., Peoria 8, Ill., and requesting Form 8995.

Speedy Post-Hole Digger

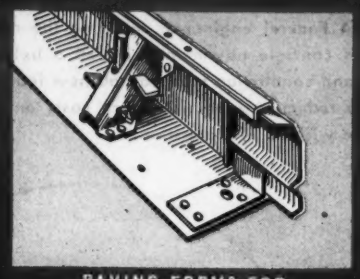
A post-hole machine said to be capable of digging 600 holes a day is described in a four-page brochure available to readers of CONTRACTORS AND ENGINEERS MONTHLY from the R. J. Piper Mfg. Co., Princeton, Ill.

The Piper Speedigger, simple to operate, can be mounted on almost all standard tractors. It includes a platform, with hand-rail, for the operator, keeping him out of the way of dirt and gears. Capable of cutting a hole up to 42 inches and of drilling perpendicularly in any grade, the digger is equipped with an auger which has replaceable cutting edges of special tool steel. Holes 54 inches deep can be cut with the Super model. Augers are available in 4, 6, 9, 10, and 12-inch diameters, the 9-inch being standard. All augers drill holes ¾ inch larger than their stated size, eliminating auger drag on the side walls of the hole. Precision-built, the digger uses Timken roller bearings throughout. Gears are drop-forged and case-hardened, with the rack and spur gears steel cut. The gear transmission case is sealed and runs in an oil bath for lubrication.

California Sales Manager

The appointment of Harry B. Ogle as Sales Manager of the governmental sales division has been announced by the Capitol Tractor & Equipment Co., North Sacramento, Calif. Associated with northern California firms for nine years, Mr. Ogle will have charge of sales to city, county, and state agencies.

FASTER CONSTRUCTION



PAVING FORMS FOR ROADS AND AIRPORTS

CLAMSHELL BUCKETS

CONCRETE BUCKETS

Blaw-Knox Equipment is first choice of construction men who have a reputation for getting projects completed in a hurry and at lowest possible cost.

Modern and rugged design endows Blaw-Knox Construction Equipment with production capacities that were unheard of heretofore.

You'll find this trouble free equipment hard at work building roads, airports and general concrete construction all over the world.

Your nearest Blaw-Knox Distributor will handle your inquiry promptly and efficiently.

BLAW-KNOX

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2067 FARMERS BANK BLDG., PITTSBURGH 22, PA.
New York • Chicago • Philadelphia • Birmingham • Washington
REPRESENTATIVES IN PRINCIPAL CITIES

KNOW YOUR BLAW-KNOX DISTRIBUTOR

ALABAMA
Birmingham — Construction Equip. Co
ARIZONA
Phoenix — State Tractor Equipment Co
ARKANSAS
Little Rock — Lyons Machinery Company
CALIFORNIA
Los Angeles — La Bar-Rix Machinery Co
E. M. Ornitz & Co.
San Francisco — C. H. Grant Company
COLORADO
Denver — Ray Corson Machinery Co
CONNECTICUT
New Haven — W. I. Clark Co.
DELAWARE
Philadelphia, Pa. — Giles & Ransome
DISTRICT OF COLUMBIA
Washington — Hatt & Deutsch Mach. Co.
FLORIDA
Jacksonville — Florida Equipment Co.
Miami — Florida Equipment Company
Tampa — Florida Equipment Company
GEORGIA
Atlanta — W. C. Cave & Company
IDAHO
Boise — Intermountain Equip. Co.
ILLINOIS
Chicago — O. T. Christerson Co.
St. Louis, Mo. — O. B. Avery Company
INDIANA
Indianapolis — Reid-Holcomb Co.
Chicago, Ill. — O. T. Christerson Co.
Louisville, Ky. — Brandeis Mach. & Supply Co.
IOWA
Davenport — Clarke-Robinson Co.
Des Moines — Herman M. Brown Co.
KANSAS
Kansas City — G. W. Van Keppel Co.
KENTUCKY
Louisville — Brandeis Mach. & Supply Co.
LOUISIANA
New Orleans — Southern States Equip. Co.
MAINE
Portland — Stanley-Cadigan Company
MARYLAND
Baltimore — Henry H. Meyer Co., Inc.
MASSACHUSETTS
Boston — The Equipment Company
New Haven, Conn. — W. I. Clark Co.
MICHIGAN
Detroit — Wm. P. Fawcette Company
Grand Rapids — Contractors Mach. Co.
Iron Mountain — Service & Supply
Division of Lakeshore Engineering Co.
MINNESOTA
Duluth — Beaupre-Ingersoll, Inc.
St. Paul — Beaupre-Ingersoll, Inc.
MISSISSIPPI
Amory — Dalrymple Equip. Co.
New Orleans, La. — Southern States Equip. Co.
MISSOURI
Kansas City — G. W. Van Keppel Co.
St. Louis — O. B. Avery Company
MONTANA
Billings — Western Const. Equip. Co.
NEBRASKA
Omaha — Andersen Equipment Co.
NEVADA
Los Angeles, Cal. — E. M. Ornitz & Co.
San Francisco, Cal. — C. H. Grant Co.
NEW HAMPSHIRE
Barre, Vt. — Cassellini-Venable Corp.
Boston, Mass. — The Equipment Co.
Portland, Me. — Stanley-Cadigan Co.
NEW JERSEY
New York, N. Y. — R. E. Brooks Company
Philadelphia, Pa. — Giles & Ransome
NEW MEXICO
Albuquerque — Lively Equipment Co.
NEW YORK
Albany — Larkin Equipment Co.
Buffalo — Traver Corporation
Elmira — Lashley, McLeod & Kinkaid
Endicott — Newing Motors Co., Inc.
New York — R. E. Brooks Company
Rochester — Keystone Builders Supply
Syracuse — Syracuse Lumber Co.
Utica — McQuade & Bannigan, Inc.
NORTH CAROLINA
Raleigh — Carolina Tractor & Equip. Co.
Salisbury — Carolina Tractor & Equip. Co.
OHIO
Cincinnati — Rish Equipment Co.
Cleveland — H. B. Fuller Equipment Co.
OKLAHOMA
Oklahoma City — Leland Equipment Co.
Tulsa — Leland Equipment Co.
OREGON
Portland — Contractors Equipment Corp.
PENNSYLVANIA
Philadelphia — Giles & Ransome
Pittsburgh — Dravo-Doyle Company
RHODE ISLAND
Boston, Mass. — The Equipment Co.
SOUTH CAROLINA
Columbia — Jeff Hunt Road Machinery Co
SOUTH DAKOTA
Rapid City — J. D. Evans Equip. Co.
TENNESSEE
Chattanooga — Nixon-Hassells Co.
Knoxville — Wilson-Woesner-Wilkinson Co.
Nashville — Wilson-Woesner-Wilkinson Co.
Memphis — Road Bldrs. Equip. Co.
TEXAS
Dallas — Conley-Lott-Nichols Mach. Co
Houston — R. B. Everett & Co.
San Antonio — Acme Wire and Iron Co.
UTAH
Salt Lake City — C. H. Jones Co.
VERMONT
Barre — Cassellini-Venable Corp.
VIRGINIA
Richmond — Rish Equipment Co.
Roanoke — Rish Equipment Co.
WASHINGTON
Seattle — Star Machinery Co.
Spokane — Intermountain Equip. Co.
WEST VIRGINIA
Charleston — Rish Equipment Co.
Clarksburg — Rish Equipment Co.
WISCONSIN
Milwaukee — Hunter Tractor & Mach. Co.
WYOMING
Billings, Mont. — Western Const. Equip. Co.
Denver, Colo. — Ray Corson Mach. Co
ALASKA
Seattle, Wash. — Northern Commercial Co.
CANADA
Montreal — Watson Jack & Co., Ltd.
Toronto — W. I. Ballentine Co.
Vancouver, B. C. — B. C. Equip. Co., Ltd.
Winnipeg — Kano Tractor & Equip. Co.
Saskatoon — Richardson Road Mach. Co.
NEWFOUNDLAND
St. Johns — Dominion Distributors Co.

Contribution to Peace By Construction Men

Editorial in "Central Constructor" Outlines the Problems and Challenge To Contractors in the Peace

✦ MORE than any other great conflict in history, this has been an engineers' and contractors' war. They were called upon by the nation to build the war-waging machine, to house the plants that made its military equipment, armaments, and munitions, to build the roads, the airports, the harbors, the docks, pipe lines, and myriad other facilities, at home and in all parts of the world, that were vital to victory. They responded to the call and did their duty well. Many were led by that duty to their deaths.

It is not to be expected that those who return—the architects, engineers, contractors, superintendents, and construction experts in all crafts—will have gone through their experiences of recent years and emerged wholly unchanged. They are coming back, changed themselves, to a world and an industry which have changed, too, while they were away.

The situation clearly suggests that there is a problem of reconverting personnel within the construction industry while the nation's economy is also seeking its way back to peacetime operations.

Many officers of construction firms, key men and in many instances the contractor himself, have been in the armed forces. Some are still in service. Others have engaged in war work after having worked on construction projects where their equipment was taken over by the government upon completion of a particular job. Some construction firms were compelled simply to suspend all operations because no one remained at home to carry on their business.

Now with the end of hostilities many former contractors have no equipment of their own. Some are undecided whether to continue in the same line of construction they followed prior to the war or to transfer their attention to other fields. It will seem desirable to some to diversify their operations, undertaking slightly smaller projects in more than one class of work. And still others will unquestionably endeavour to expand beyond their pre-war capacity.

Nearly all, in each of these classifications, will find themselves confronted with the necessity for reassembling an efficient organization—and they will find it no small task.

For many of the contractors' former supervisory personnel have aged to a degree at which they can no longer "hit the ball". Some of these would normally have retired from such positions except for the patriotic appeal of war's demand for their skills and capacities. They will now be ready to quit.

Others, younger ones mostly, will have held positions of considerable authority during the war years, in uniform or not, and will have drawn compensation on a scale which will make the normal rates of pay in the construction industry seem disappointing. They will bring to their new jobs an element of "temperament" that may make them require careful handling.

Others will have had valuable construction experiences, will have learned how to build well and quickly, but will have trouble in adapting themselves and their methods to a system under which it is of primary importance to know and count costs. They will find themselves also obliged to perform under the handicaps of greatly reduced manpower.

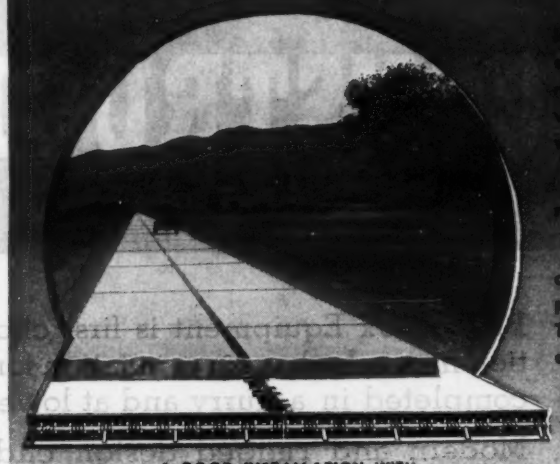
They are coming back to a world in which costs have advanced enormously—much of the increase in the construction field being traceable to old equipment which breaks down frequently and stops operations—though payrolls go on through such stoppages without interruption or deductions.

Finally, there will be evident in many construction crews an apparent lack of interest in the progress of the work on the part of all too many of the employees. This is inevitable with the termination of the "victory" incentive. Much of the loyalty to the employer and interest in his successful performance of a contract will be found to have disappeared. During the war, when practically every construction job bore some direct relationship to our military objectives, even an indifferent workman might rise to heights of splendid performance because he took pride in his

(*Concluded on next page, Col. 2*)

There's no Disagreement on . . . . . .

Road Joints!

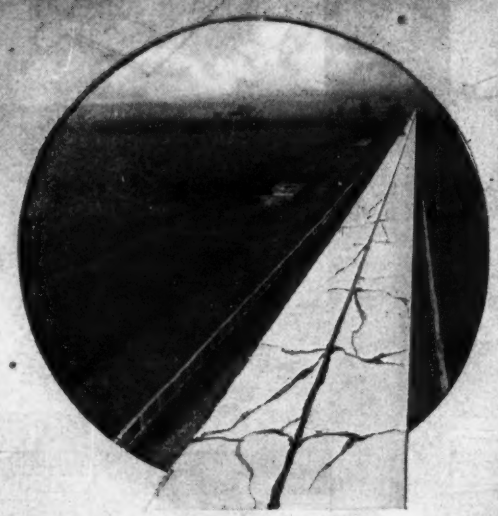


A GOOD INSTALLATION WITH KEYLODE TRANSVERSE JOINTS

In the 20s and 30s when concrete road building was getting its start, it was logical for highway engineers to resist the use of metal road joints. These joints were costly and new. Their use would cut down the total miles of hard road that could be built with the money at hand—and farmers were stuck in the mud!

The objective then was miles today. The cost tomorrow in maintenance was a secondary consideration.

In 1934 Federal engineers, realizing the necessity for crack control in concrete pavements, issued a bulletin requiring expansion and contraction joints on all new federal-aid highways. The large reduction in maintenance costs on federal-aid roads attests the wisdom of this action.



A POOR INSTALLATION WITH NO TRANSVERSE JOINTS

Today there's no disagreement on road joints. Everyone agrees that crack control in concrete pavements by the use of load transferring expansion and contraction joints is an economic necessity. The only unsettled problems involve the spacing, the design and the cost.

The mass of available data will make it easy for highway engineers to establish a joint spacing standard soon.

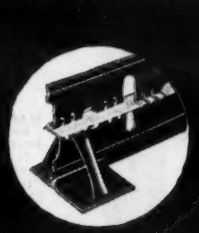
Many engineers have already decided that the KEYLODE contraction joint is the design they want—and the cost of KEYLODE joints is so little that you can get BOTH *miles today* and *crack control tomorrow* for the same money.

Write for Bulletin

HIGHWAY STEEL PRODUCTS CO.

Chicago Heights, Ill.

KEYLODE



CARRYHAUL

Trade Mark Registered

FOR TRAILING EQUIPMENT 'CROSS TOWN OR 'CROSS-COUNTRY..WITH ECONOMY

There's a proper size of safe, easy-loading MARTIN TRAILER to hustle light equipment 'cross town —or to highball a giant D8-Dozer 'cross-country—with economy.

Your "CATERPILLAR" Dealer is your MARTIN Dealer. See him for your trailer needs.

Write for Booklet

MANY MARTIN MODELS 5 TO 20 TON CAPACITY

MARTIN MACHINE COMPANY

KEWANEE, ILLINOIS

"Jet propelled!"

New Hot-Mix Manual On Pavement Design

Said to be the first complete text on the design of hot-mix asphaltic-concrete pavement and on the set-up for any particular job mix, a "Manual on Hot-Mix Asphaltic-Concrete Paving" has just been published by The Asphalt Institute. The 112-page volume has four main divisions: Part I, Recommended Thickness Requirements; Part II, Specification A-2-a Hot-Mix Hot-Laid Asphaltic-Concrete Paving (Dense-Graded-Aggregate Type); Part III, Specification A-2-b Hot-Mix Hot-Laid Asphaltic-Concrete Paving (Graded-Aggregate Type); and Part IV, Inspection of Job and Plant.

Specifications A-2-a and A-2-b are alternates and supersede the Institute's former Specifications A-2 and B-8. These specifications for asphaltic concrete of the dense-graded-aggregate type represent two different philosophies of design, and both are presented in this volume so that engineers may select the one which best fits their requirements from the standpoints of available aggregates, climatic conditions, and equipment. The fundamental difference between the two lies in the manner of specifying aggregate gradation, and the relative emphasis placed on the density of the compacted mixture.

In the dense-graded-aggregate type, aggregate gradations are specified on the basis of per cent passing and retained on each of the intermediate sieves, which insures good continuity of gradation. Limits of per cent passing and retained on the intermediate sieves are purposely broad to allow as much leeway as possible in securing a final mixture which, when compacted, will meet certain density and stability requirements. Density of the laboratory compacted mixture should show from 2 to 5 per cent voids.

In the graded-aggregate type (A-2-b), the basis for aggregate-gradation specification is the total per cent passing each sieve. Limits of per cent passing each sieve may be plotted to produce two curves, and continuity of gradation can be secured in the final mix by selecting a gradation which approximates the shape of an average of the two outside limiting curves. Density of the laboratory compacted mixture must show from 5 to 10 per cent voids.

Available free of charge to highway officials, engineers, contractors, and technologists, this Manual may be obtained by readers of this magazine direct from The Asphalt Institute, 801 Second Ave., New York 17, N. Y.

Contribution to Peace By Construction Men

(*Continued from preceding page*)

and his firm's contribution towards victory. That appeal is gone. Time and patience and skillful leadership within a construction organization will be needed to revive the old-time company spirit.

But the problems of the returning contractor are not, of course, to be restricted entirely to personnel. He will have an equipment puzzle or two, also. He may find irritating delays in securing equipment from firms with which he has dealt before. He will be offered new brands of equipment by manufacturers who are entering the construction-equipment business because of the anticipated "cleaning" to be made in that market.

And just as new firms will enter the equipment and the material fields, new men will set themselves up as contractors. Some among them will be thoroughly incompetent and will go out quickly—after spoiling a few good jobs for better men. Others will become the leaders of the industry in the next decade. This is a field of endeavour with a fairly high rate of turnover among the heads of businesses and among businesses themselves.

The contractor—old or new—who selects his equipment carefully, who exercises good judgement in choosing his personnel from top to bottom of his organization; who carries on his operations in a businesslike manner, dealing fairly with his own employees, with equipment and material men; building work strictly according to plans and specifications; keeping accurate costs; being as conscientious in advance estimating as in cost accounting; and devoting a part of his time to advancement of the general welfare of the industry in which he intends to make his living—that contractor is sure to succeed.

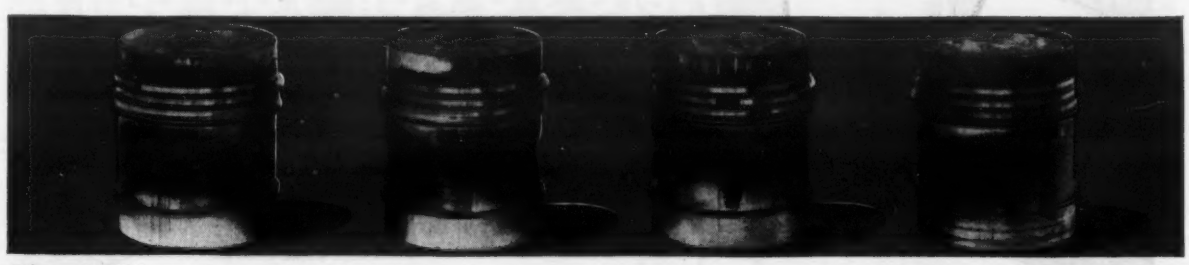
The war was—as mentioned previously—an engineers' and a contractors' war. The peace that follows it does not merely take up where the peace which preceded war left off. It takes up as a highly mechanized peace. It comes into being suddenly with a gigantic backlog of unfilled construction projects, a tremendous accumulated deficit in all of the vast range of improvements for which the world looks to contractors. It can be a contractors' peace. Contractors are the ones who can make it a profitable one.

Reprinted from *The Central Constructor* published by the Central Branch of the Associated General Contractors of America

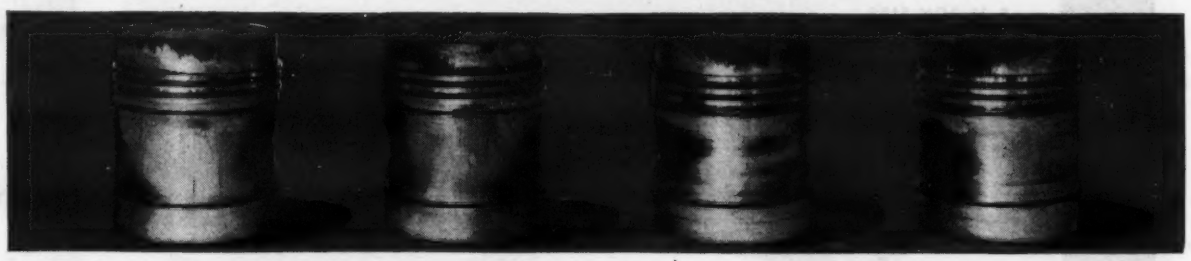
Ohio's Rural-Road Plans

"We have a big job ahead making our underprivileged roads passable the year round", Perry T. Ford, Ohio State Highway Director, said recently, announcing that the state's 16 per cent of untreated rural roads, 13,965 miles, are going to receive special attention in the huge post-war highway program, plans for which are now approaching completion.

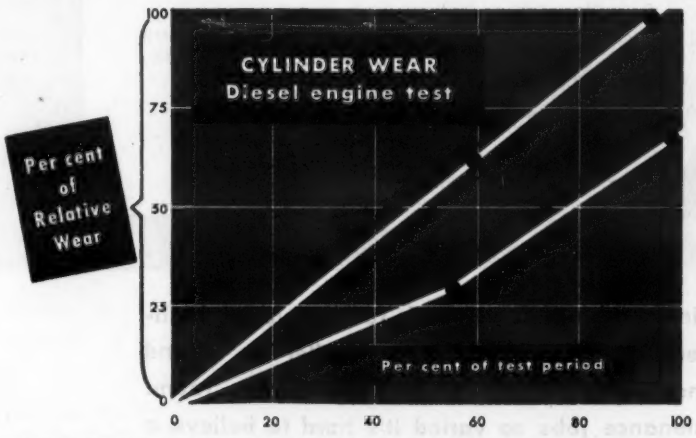
How RPM DELO Oil keeps Diesel pistons clean



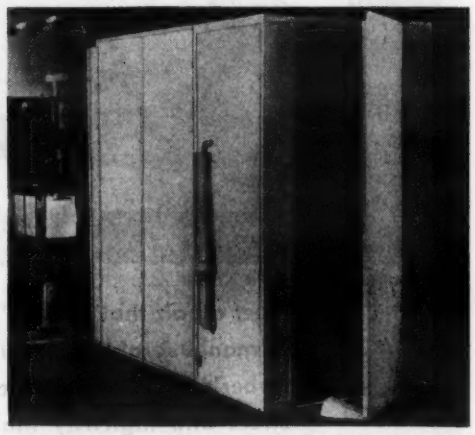
After only 265 hours of operation using the best *uncompounded mineral oil*, these Diesel test engine pistons were coated with a heavy, sticky gum-carbon deposit, as shown in this actual photo. The few bright areas were kept clean by rubbing cylinder walls. Oil ring slots were clogged, and blowby, resulting from stuck rings, caused a deposit of gum to form on cylinder liners. The engine was run on 80% load in a "Hot Box" where the air to the radiator was maintained at 125° F., simulating severe summer operation in high temperature areas.



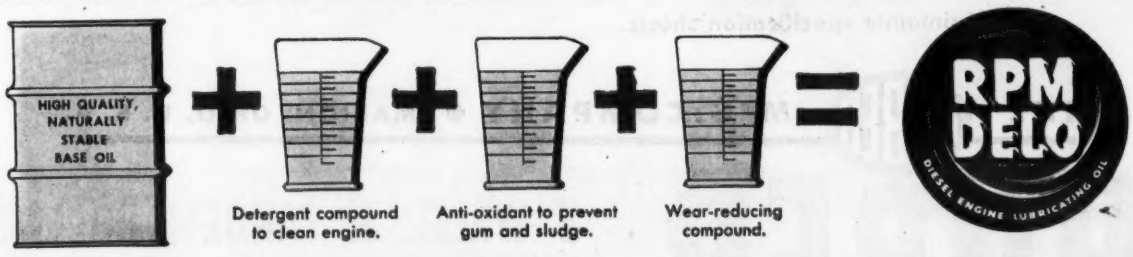
Run five times longer under the same conditions, using RPM DELO Diesel Engine Lubricating Oil, the same engine's pistons were practically clean, as this photo shows. After 1200 hours, all the rings were free and unstuck. There was no appreciable amount of carbon formation in oil ring slots and the ring grooves were free from carbon deposits. Special, patented compounds in RPM DELO Oil give it this unusual ability to keep engines clean. They resist the formation of gum and varnish, remove deposits and keep contaminants in suspension.



How cylinder wear is reduced by minimizing gum-carbon and varnish formation on Diesel engine pistons through the use of RPM DELO Oil is shown by the above chart. For other charts, tests and a complete technical report on RPM DELO Oil, write for Booklet T-7, Standard of California, San Francisco 20, California.

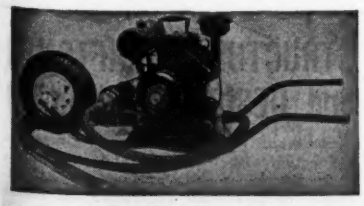


This "Hot Box" cabinet is used in the laboratory to test Diesel lubricants in engines. It is the one mentioned above. In many devices, RPM DELO Oil is checked under conditions far more severe than are likely to be met in the field.


HIGH QUALITY, NATURALLY STABLE BASE OIL
Detergent compound to clean engine.
Anti-oxidant to prevent gum and sludge.
Wear-reducing compound.
RPM DELO
DIESEL ENGINE LUBRICATING OIL

STANDARD OF CALIFORNIA

RPM DELO Oil has world-wide distribution under the names: RPM DELO, Caltex RPM DELO, Signal RPM DELO, Imperial RPM DELO (CONCENTRATE)



Complete line of gasoline, pneumatic and electric driven concrete vibrators and grinders
Write for information and prices
ROETH VIBRATOR COMPANY
1737 Farragut Ave. Chicago, Ill.

A drill bit overlaid with EuteChrom 11, before grinding.

Hard-Surfacing Rods For Toughest Wear

Two new hard-surfacing rods designed to take care of the toughest wear problems on parts which come in contact with earth, rock, and sand, such as dipper teeth and hard-hitting drill bits, have been announced by Eutectic Welding Alloys, Inc., 40 Worth St., New York 13, N.Y. Each of these rods carries a matrix filled with extremely hard particles. The new rods are EuteChrom 11, for use with the oxy-acetylene torch to give a smooth, clean deposit, and EuteChrom 12, which is sheathed with a special flux coating for use with either ac or dc to provide a spatter-proof flow like a mild-steel electrode.

EuteChrom 11 is applied after thoroughly cleaning the part by grinding or machining to remove scale, dirt, and grease. EuteChrom flux, specially prepared to promote bonding of the weld metal with the base metal at low heat, is applied by dipping the hot end of the rod into the flux and rubbing in on the base metal. The EuteChrom 11 rod is tubular and contains particles of carefully blended and mixed hard alloys. The area to be hard-surfaced is heated to approximately 1,600 degrees F, using a medium carburizing flame. Steels having more than 0.35 per cent carbon should be entirely preheated to a temperature between 700-900 degrees F before hard-facing.

EuteChrom 12 is based on the same principles, with the addition of a special coating for use with the arc welding process. This coating is designed to allow a steady and stable flow of the filler metal onto the weld area and to eliminate oxidation. It also conditions the surface of the parent metal, permitting the alloying at low heat of the weld metal without fusion with the parent metal.

The details of procedure for both EuteChrom 11 and 12 are given on page 1 of Vol. 3, No. 1 of the "Eutectic Welder", which may be secured by our readers direct from the manufacturer by mentioning this text by title.

Drum-Opening Tool

Information on the O'Brien easy-to-use drum-opening tool may be secured by interested contractors and state and county highway engineers direct from Merrill Brothers, 56-02 Arnold Ave., Maspeth, L. I., N. Y. Operating on the principle of a kitchen can opener, it is claimed to cut away the top of metal drums or containers quickly, easily, and safely.

Made of a steel drop forging, 23½ inches long and weighing 5½ pounds, this tool cuts smoothly and evenly, folding the edge back close to the barrel edge.

Here's a Pair You Can't Beat When It Comes to "Road Work"
HUBER VARIABLE WEIGHT TANDEM 8-12 TON SIZE
HUBER MAINTAINER (WITH ONE-WAY SNOW PLOW)

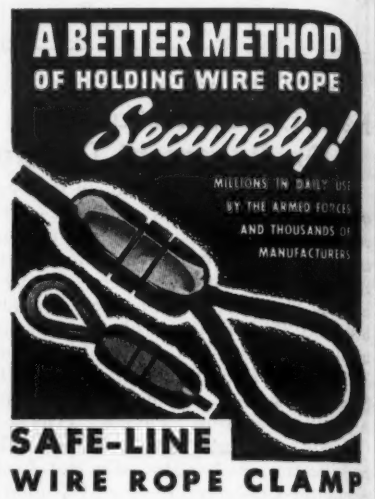
Meet a pair that's "tops" in road work . . . Huber's fast, powerful, highly maneuverable, long-lived Variable Weight Tandem Roller . . . and Huber's versatile Maintainer, which makes short work of year 'round street and highway maintenance jobs so varied it's hard to believe a single machine could handle them successfully. To get better acquainted with these dependable 1945 Hubers, write today for Tandem and Maintainer specification sheets.

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER

3 WHEEL & TANDEM ROLLERS

YEAR 'ROUND MAINTAINER



SAFE-LINE WIRE ROPE CLAMP

Eliminates Splicing and Serving
Much faster—saves time—reduces cost. Minimizes rope or sling breakage. Holds tight thimble.

Easy to Use, Easy to Re-adjust
No highly skilled labor or special tools required. Easy to adjust as rigging stretches.

Outpulls Strongest Rope
¾" 6 x 19 Improved Plow Steel Wire Rope broke at 46,850 pounds on Riehle Testing Machine. SAFE-LINE Clamp *held.*

Economical—Use Many Times
Thousands of the first SAFE-LINE Wire Rope Clamps made are still in use. Low initial cost.

Prevents Injury, Mental Hazards
Exposed needle-sharp wire ends safely enclosed inside of clamp protects against cutting or scratching hands and arms. Smooth rounded shape prevents catching clothing or fouling.

Replacement Guarantee
Every SAFE-LINE Wire Rope Clamp carries a replacement guarantee against breakage and fracture.

FOR ROPE SIZES ⅛" TO ¾"

APPROVED BY UNDERWRITERS LABORATORIES

APPROVED BY CIVIL AERONAUTICS ADMINISTRATION

Never Slips

FORGED AND MASTER COINED TO FIT ROPE

Double spiral splines fit each wire and strand, provide a perfect, secure GRIP on rope. Pressure equally distributed over large area eliminates cutting action. Locking lugs automatically line-up threads.

WRITE FOR DESCRIPTIVE PRICE LIST FOLDER

NATIONAL PRODUCTION COMPANY
4559 ST. JEAN AVENUE • DETROIT 13, MICHIGAN

STRUCTURAL DRAFTSMEN and DESIGNERS WANTED

Structural steel and reinforced concrete in connection with the design of highway structures. Immediate and permanent employment. Salary open. Submit experience and educational record together with minimum acceptable salary with letter of application.

BRIDGE DEPARTMENT
S. Dak. Highway Commission, Pierre, South Dakota

Old Truss Replaced By Concrete Bridge

New 845-Foot Structure Has 161-Foot Continuous Span Over Creek; Approach Fills Paved at Creek Edge

BUILT 43 years ago, the old narrow steel-truss bridge across Uphapee Creek north of Tuskegee, Ala., has been replaced with a reinforced-concrete structure, 845 feet long, made up of eighteen 38-foot reinforced-concrete deck-girder spans, and one 161-foot continuous span of three sections of 48, 65, and 48 feet, supported on the four main piers. Located on Ala. 81, the old bridge, which had a through-truss main span of 141 feet resting on cylindrical steel piers filled with concrete, and two pony-truss spans of 60 feet on each side with wooden trestle approaches, had a roadway width of only 16 feet and had been condemned for passage of any vehicle weighing over a ton.

The contract for the new bridge was awarded by the Alabama State Highway Department to the W. C. Howton Contracting Co. of Birmingham, Ala., on its low bid of $86,000. The 4,953 feet of earth-work approaches and paving were constructed by the J. E. Milam Contracting Co., also of Birmingham, for $36,000. Designed by Highway Department engineers for H-15 loading, the new bridge has a 26-foot roadway with 1½-foot curb walks, while the approaches have a 30-foot roadway on which is laid an 8-inch compacted-gravel base as a foundation course for a 20-foot single bituminous treatment, topped by a course of plant-mix and flanked by 5-foot shoulders. Work on the bridge and approaches began in June, 1944, and was completed by the middle of May, 1945.

As the new bridge occupies the same site as the old one, traffic was detoured over U. S. 29, a parallel route 10 miles to the east, during the construction. At this location Uphapee Creek flows nearly due west on a sandy bottom, and during the low-water season its depth is about 4 feet. This increases at flood stages by 17 feet, with a corresponding change in width from 65 to as much as 1,200 feet. For construction purposes, the contractor built a temporary bridge 14 feet wide on timber falsework immediately adjacent to the east side of the old structure.

The old truss was removed by burning the steel members directly over the piers with a torch, and attaching a cable to the center of the truss, with the other end fastened to the 40-foot boom of a Lorain 40 crane which took a position on the temporary bridge at one side of the truss span. A pull on the cable sent the old steel tumbling into the shallow water from which it was pulled ashore and scrapped.

Pier Construction

In the entire 845-foot length of bridge only three piers are in the water, and the construction of these was done in the dry season during the summer of 1944 to benefit from the low-water stage. Cofferdams for these piers were built of 14-inch steel sheet piling, 14 feet long, driven by a McKiernan-Terry steam hammer working in 20-foot leads from the Lorain crane stationed on the timber falsework. The points of the piling were driven to 2 feet below the elevation of the bottom of the new footings to form a cofferdam 26 x 15 feet. This was unwatered by five pumps: a Marlow 4-inch with a LeRoi engine; two Jaeger 3-inch with Wisconsin engines; and two Novo 2-inch pumps. The cofferdam was then excavated by a ½-yard clamshell bucket on the crane, and the removed material was piled outside the cofferdam to check leakage.

The cofferdam was built large enough to accommodate the two footings for the two-column-bent piers which are used throughout the bridge. Nine untreated-timber piles were driven as a foundation for each of the eight footings on which the four main piers rest. The piles were 20 feet long, 10-inch diameter at the butt and 8-inch at the tip, and were driven by a 3,000-pound drop hammer working in 20-foot swinging leads on the Lorain crane. They were driven to refusal through about 11 feet of sand until an unyielding marl stratum providing a 20-ton bearing was encountered. The piles were then cut off at an elevation so that they would project 1 foot into the concrete footings.

Forms were then built within the cofferdam for the two footings, 8 x 9½ x 3½ feet deep, and these were poured with the concrete mixer set up on the temporary bridge and chuting the concrete directly into the forms. The two columns, 2 feet square and spaced 16 feet on centers, were constructed next, with the concrete being lifted from the mixer to the top of the pier forms in a 1-yard bucket swung by the crane. In this manner were also poured the caps, 3 feet wide x 2 feet 9 inches deep, built across the top of the columns. On the main piers across the creek the distance from the bottom of the footings to the top of the caps is 36 feet, while on the other piers this distance is 29 feet. The sixteen other intermediate bents have two footings, 7 x 7 feet, each resting on six foundation piles. The two abutments

(*Continued on next page*)

It Still Pays to ORDER EARLY

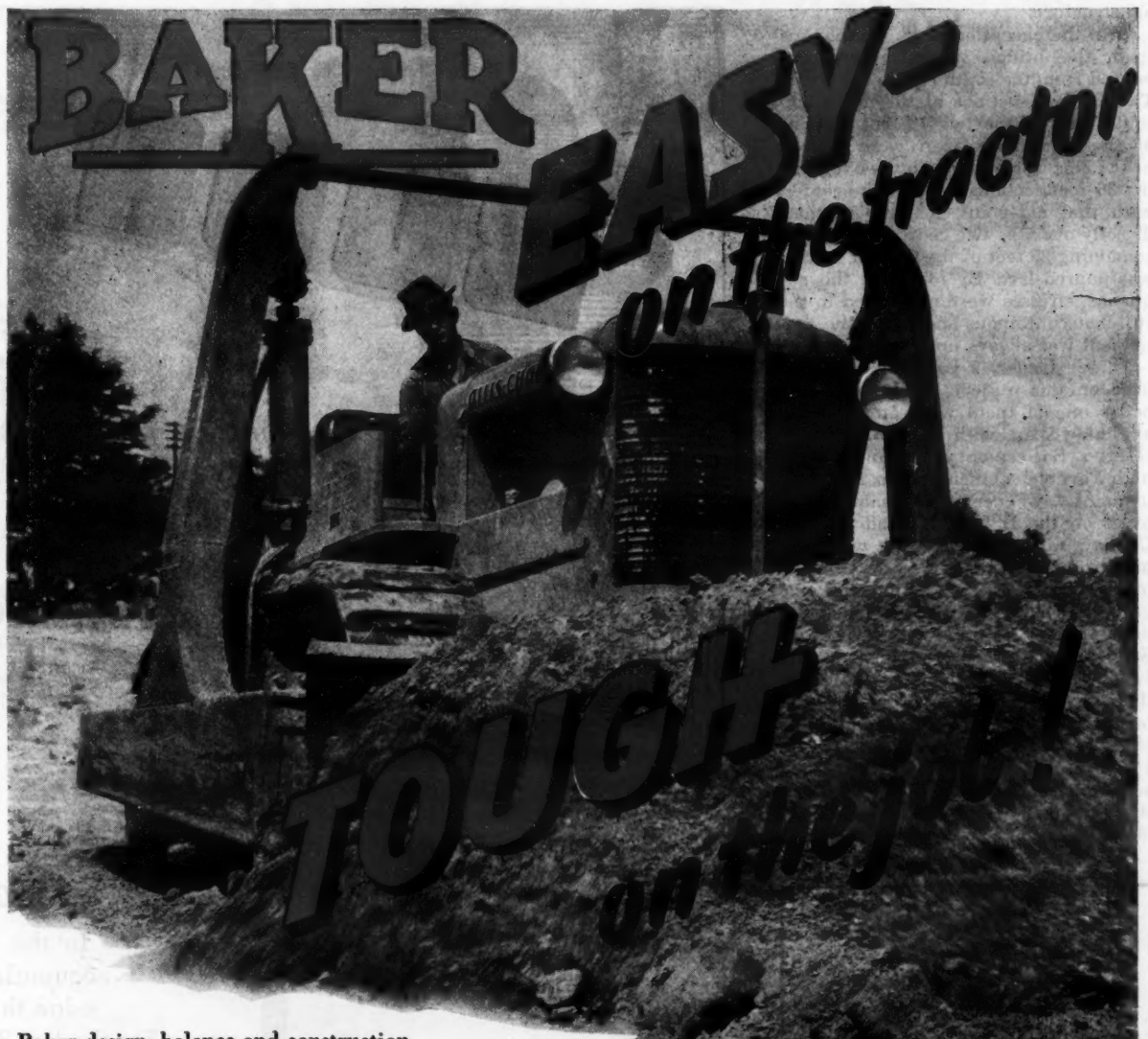
ALL TYPES AND SIZES

DAVENPORT-FRINK SNO-PLOWS

We are now building Sno-Plows to meet the demands for the coming snow season and hope to be able to meet the requirements of all of our customers. However, we must caution that production cannot be unlimited under present conditions and we again urge the early placement of orders to insure deliveries in time to meet the emergencies of the coming winter. Our fullest cooperation will be extended at all times.

DAVENPORT BESLER CORPORATION Dept. A DAVENPORT, IOWA

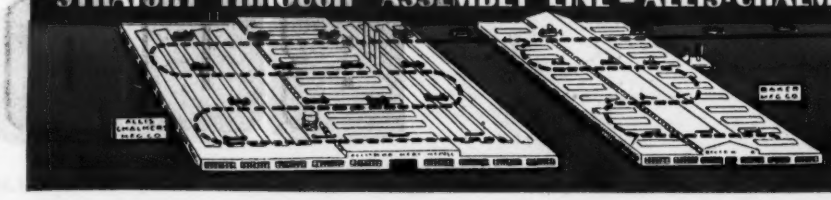
Made in Eastern U.S.A. by CARL H. FRINK. 1000 Islands, CLAYTON, NEW YORK



Baker design, balance and construction pays off in performance on the job — in continuous hour after hour operation — in extra yardage moved — in less wear and tear on the tractor. Baker hydraulic and cable 'dozers were designed specifically for Allis-Chalmers tractors — for their weight, power and speed. That's why they're easy on the tracks, rollers, idlers, sprockets, and final drives — that's why they turn maximum tractor power into push on the blade — that's why you can expect more from a BAKER, AND GET IT!

BAKER AC SPRINGFIELD, ILL.

"STRAIGHT THROUGH" ASSEMBLY LINE - ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

Old Truss Replaced By Concrete Bridge

(*Continued from preceding page*)

rest on 12-pile footings and are 40 feet long, 10 feet wide at the base, and 30 feet high. In building the footings for the piers not in the water, Wakefield sheeting was driven by an Ingersoll-Rand air hammer operated by a Worthington 150-cfm air compressor.

Bridge Superstructure

The bridge superstructure consists of four reinforced-concrete girders 1 foot 4¾ inches wide; on the three sections of the continuous span over the creek the beams are arched and have a depth of 2 feet 8 inches at the mid-points of the spans, while over the caps they are 5 feet 2 inches deep. A 6-inch slab serving also as a wearing course is laid on the girders, and at the sides are curbs, 1 foot thick and 1 foot 9 inches high. The new bridge is 8 feet higher than the old structure.

With the exception of the continuous span, the bridge superstructure was poured from the south end to the north. Two 30-foot sections at the north and south ends of the two 48-foot sections of the continuous span were poured next. This was followed by two adjoining 36-foot sections towards the center, with the mid-point of these sections directly over the two central piers. The remaining 29 feet of the 65-foot section was poured last. By following this sequence, stresses were minimized in the 161-foot continuous span, and the settlement was always under control.

Three Jaeger 2-bag mixers were used on this project, and in the deck pours one of them was set up on an adjoining span, with the other two in reserve. Bag cement came from the Lehigh Portland Cement Co. at Birmingham, Ala., whence it was shipped 160 miles on the L & N railroad and the Chehaw railroad to a siding within ½ mile of the job, and hauled the remaining distance by truck. The sand and gravel for aggregate were supplied and delivered to the job by the Tuskegee Sand & Gravel Co. from its plant only ½ mile from the bridge site. Water for the concrete was taken from the creek below by a Novo 2-inch pump through 150 feet of 1½-inch rubber hose to a 1½-inch iron pipe, 700 feet long, laid across the bridge to provide a constant supply of water. The water was pumped into a 500-gallon tank which was supported on a 15-foot wooden framework so that it could flow by gravity into the tank on the mixer. The tank and framework was pulled about as needed.

Concrete Mix

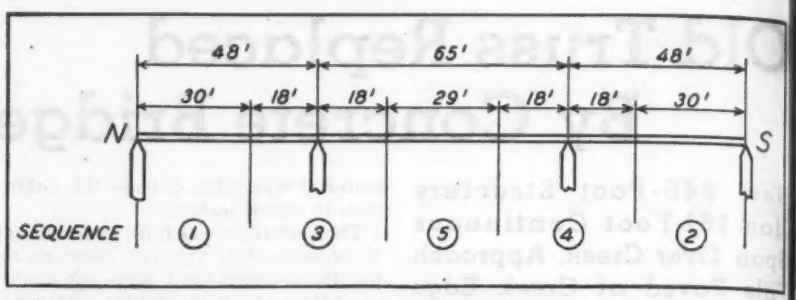
The sand and gravel used in the mix conformed to the following gradations:

Sieve Size	Per Cent Passing Gravel	Sand
2-inch	100	.....
1½-inch	95–100	.....
1-inch	40–90	.....
¾-inch	35–70	.....
⅜-inch	10–30	100
No. 4	0–5	95–100
No. 8	.....	75–100
No. 16	.....	45–90
No. 50	.....	3–35
No. 100	.....	0–8

A typical 2-bag batch of concrete contained:

Cement	188 lbs.
Sand	398 lbs.
Gravel	622 lbs.
Water	12 gals.

The batches were weighed on a Johnson 2-beam springless scale, mixed for 2 minutes, and then pushed to the forms in Insley ½-yard two-wheel concrete buggies. The deck forms were made from 2 x 8-inch tongue-and-groove stock, tied with No. 9 wire. To protect the concrete from rain once a pour had started, the contractor erected 2 x 8-inch posts, 6 feet high with 2 x 8 knee braces, every 8 feet along each side of the superstructure, and connected them with 2 x 8 cross pieces over which was stretched a canvas tarpaulin.

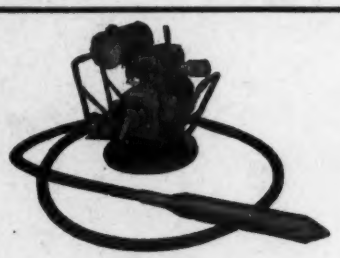


The three sections of the 161-foot continuous deck-girder span on the Uphapee Creek bridge near Tuskegee, Ala., were poured in the sequence shown in the diagram above.

Open Joints Used

The bridge design called for a 1-inch open joint in the superstructure over each cap. To get that result the contractor made a joint ½ inch thick by nailing pieces of ¼-inch plywood together with No. 4 nails about every 8 inches, until he had a section 20 feet long and 2 feet 8 inches deep at the center and deeper at the ends to correspond to the beams. Against a newly poured span ½-inch rods, 2½ feet long, were set vertically every 8 inches across

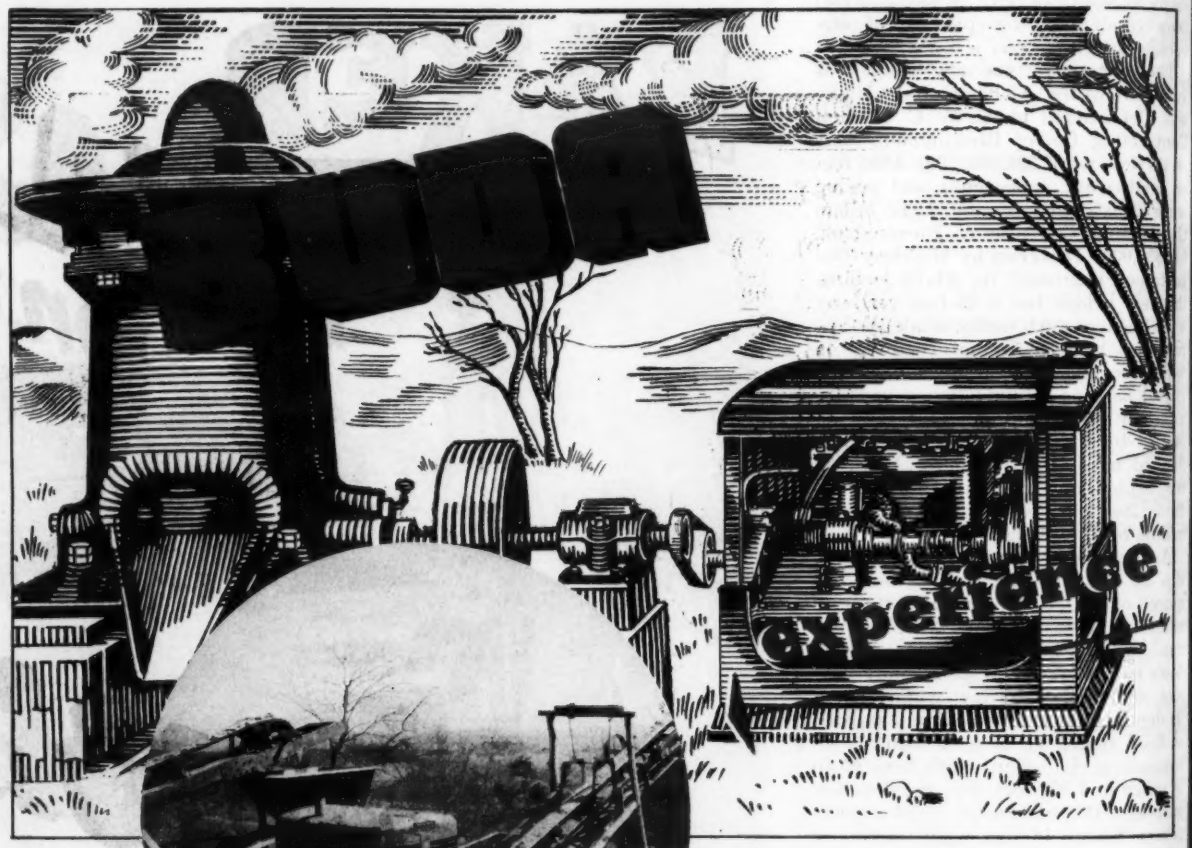
(*Concluded on next page*)



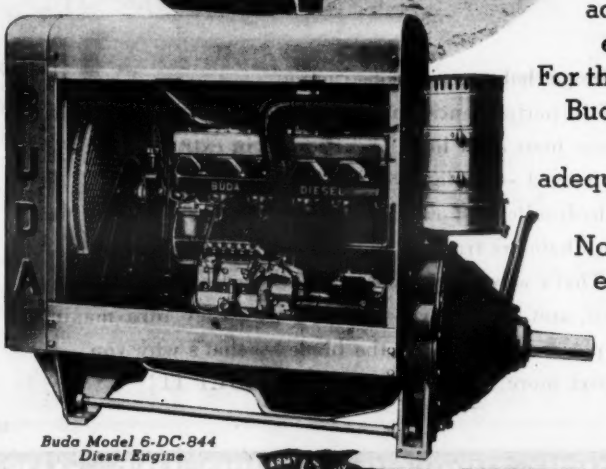
Concrete
VIBRATORS
Gasoline Engine or
Electric Motor Driven
CONCRETE GRINDERS

OTHER PRODUCTS
FRONT END SHOVELS
for Industrial Tractors
HEATING KETTLES
for Asphalt and Tar
AGGREGATE DRYERS
for Stone and Sand
ASPHALT PLANTS
Portable — Stationary
Write for Circulars

White Mfg. Co.
ELKHART INDIANA



Modern Buda 6-DC-844 Diesel powering a pulveriser



Buda Model 6-DC-844 Diesel Engine

. . . Pacing the Progress of Power

In the years since 1881 Buda has accumulated the engineering knowledge that today spells EXPERIENCE. For the last 35 of these 64 eventful years, Buda has manufactured engines...each progressive engine model more adequate for the job at hand and increasingly powerful as the need arose. Now you can have the most powerful, efficient and economical engine yet designed—*built by Buda*, present day symbol of progress in power.

Write or wire today for facts

Buda Universal Diesel Injector and Nozzle Tester

ARMY NAVY BUDA

15412 Commercial Ave.
HARVEY (Chicago Suburb) **ILLINOIS**

Buda Model 2215-SB "all purpose" Jack

Old Truss Replaced By Concrete Bridge

(*Continued from preceding page*)

the cap. The upper ½-inch tips of these rods had been heated by a torch, and then pounded with a blacksmith hammer to form a small hook. The plywood form was then placed against these rods and the concrete of the new pour was dumped against the wooden barrier. After the concrete had set, the rods with the hooks on top were pulled out by using another rod made in the same way with a bent end so that it could be hooked on the rods placed between the spans. The rod doing the pulling had an eye at the other end through which a bar was passed to obtain leverage. When the rods were removed, the ½-inch plywood set in the 1-inch opening was easily removed in one piece and used over again, while a 1-inch joint was left between the slabs. A 1 x 1-inch strip was laid across the top of the joint to prevent any grout from entering.

The concrete was screeded with a 39-foot truss screed and was cured with a 2-inch layer of sand which was kept wet on top of the deck.

Slope Paving

The approach-fill slopes at the abutments were paved with a 6-inch layer of plain concrete to prevent erosion and to keep the approach fills from sliding. This slope paving extended for the full width of the bridge and 24 feet back on each side with an average slope distance of 29 feet, or 1 foot above maximum high water. At the base of the fill a toe wall was poured 6 inches wide and 3 feet deep, and above that the concrete slope paving was laid in 3-foot panels around the fill. Alternate panels were poured, using wooden forms and screeding downhill, and dummy joints were put in at every panel to give the concrete the appearance of being laid in blocks 1 yard square. The vertical joints were staggered.

Quantities and Personnel

A crew of nineteen men under J. W. Dill, Superintendent, were employed on the bridge in the following capacities: a carpenter foreman, six carpenters, a concrete foreman, ten laborers on concrete pours, and one crane operator. The major estimated quantities on the W. C. Howton contract were:

Excavation	2,100 cu. yds.
Untreated-timber piling	2,000 lin. ft.
Bridge concrete	1,640 cu. yds.
Reinforcing steel	383,350 lbs.

Earth Work and Paving

The approach fills and paving were completed by the J. E. Milam Contracting Co. of Birmingham by the end of 1944. Material for the fill on the north side of the bridge came from a cut and on the south side from a roadside borrow pit, and was moved by two LeTourneau 10-yard scrapers, pulled by Caterpillar D7 tractors, and four 8-yard Tournapulls. Two Caterpillar Fifty tractors pulled sheepsfoot rollers over the fill to compact it.

The 30-foot crown of the approach fills then received an 8-inch layer of gravel for a base course, which was primed with RT-2 tar applied at the rate of 0.27 gallon to the square yard for a width of 21 feet down the center. A single bituminous surface treatment was then applied to the middle 20 feet of the fill. This consisted of AC-15 asphalt applied at a temperature of 325 degrees F and at the rate of 0.42 gallon to the square yard. This was covered with slag, graded from ⅜ to 1¼ inches, at the rate of ½ cubic foot to the square yard. After a week the surface was given a tack coat of RC-2 asphalt, 0.06 gallon to the square yard, in preparation for the bituminous plant-mix which was laid 100 pounds to the square yard at a temperature of 275 to 300 degrees F. The mix was purchased from the Tuskegee Sand & Gravel Co. and laid by a mechanical spreader. The gradation of the aggregate was from ¾ inch down to dust, and in every ton of aggregate was mixed 112 pounds of AC-8 asphalt.

The major items in the J. E. Milam contract, on which J. White was Superintendent, were:

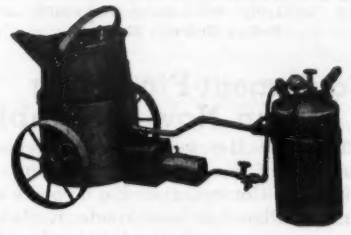
Excavation	50,720 cu. yds.
Gravel base course	6,625 cu. yds.
Single bituminous surface treatment	12,110 sq. yds.
Plant-mix	12,110 sq. yds.

For the Alabama State Highway Department, under whose direction the 845-foot bridge and approach fills were constructed, G. W. Phillips is Construction and Maintenance Engineer and J. F. Tribble, Assistant Construction Engineer. The project is located in the Fourth Division of which B. E. Higgins is Division Engineer. John W. Chambers was Bridge Engineer in charge of the design of the new bridge and H. R. Horn was Project Engineer.

CONNERY'S HEATING KETTLES

Speed up work by using a Connery Heating Kettle for building and maintaining highways, airports, barracks and roads. Made in sizes of 30, 80, 110 and 165 gallons.

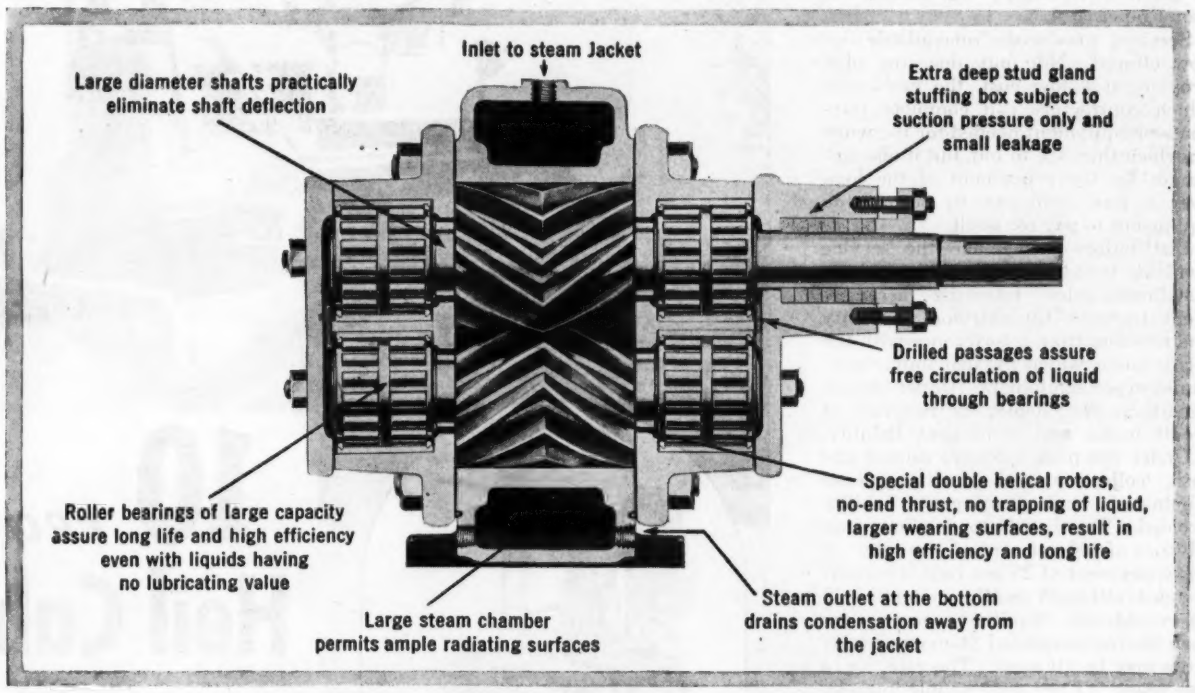
Send today for our complete catalog showing our full line of Tar and Asphalt Heating Kettles, Spraying Attachments, Pouring Pots, etc.



CONNERY CONSTRUCTION CO.

4000 N. Second St. Philadelphia 40, Pa.

HOW TO HANDLE ASPHALT WITHOUT GETTING "STUCK"


Inlet to steam Jacket
Large diameter shafts practically eliminate shaft deflection
Extra deep stud gland stuffing box subject to suction pressure only and small leakage
Drilled passages assure free circulation of liquid through bearings
Special double helical rotors, no-end thrust, no trapping of liquid, larger wearing surfaces, result in high efficiency and long life
Roller bearings of large capacity assure long life and high efficiency even with liquids having no lubricating value
Large steam chamber permits ample radiating surfaces
Steam outlet at the bottom drains condensation away from the jacket

Specify Worthington GRJ Steam-Jacketed Rotary Pumps

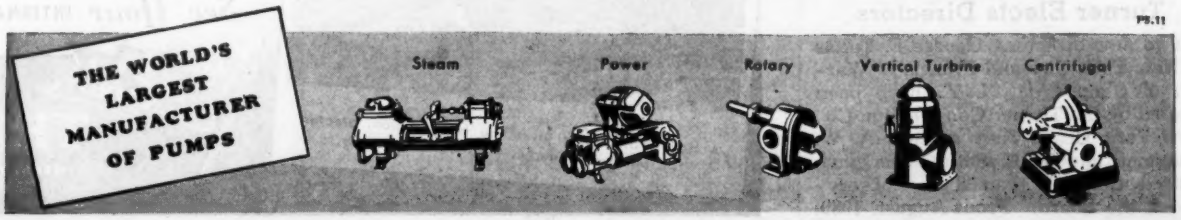
Trouble-free handling is what you want in the pump you depend on for putting asphalt where you want it when you want it.

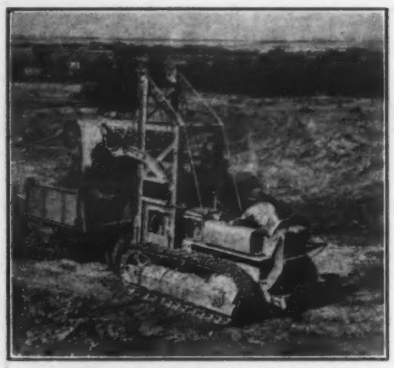
Fortunately, you can get dependability in a Worthington GRJ Steam-Jacketed Rotary Pump. The cross-sectional picture above shows you why. One thing the picture doesn't show, however, is the short starting time which results from the large radiating surfaces of the Worthington heating jacket. That means less time lost by equipment and men waiting for asphalt to flow.

Your nearby Worthington Representative can give you other valuable facts about Worthington GRJ Rotary Pumps. In the meanwhile, you can prove that *there's more worth in Worthington* by writing for Bulletin W487-B11. *Worthington Pump and Machinery Corporation, Harrison, New Jersey.*

WORTHINGTON

THE WORLD'S LARGEST MANUFACTURER OF PUMPS





A Traxcavator loads lime shale for use in repairing flood-damaged roads in Saline County, Kansas.

Equipment-Financing Plan Now Available

To assist the year-round purchase and sale of construction machinery, a simplified Construction Equipment Finance Plan has been made available to contractors and distributors by the C. I. T. Corp., anticipating the demand for adequate equipment to handle the volume of work that lies ahead. Details of the plan are available from the C. I. T. Eastern headquarters, 1 Park Ave., New York City 16; the Midwest office, 333 No. Michigan Ave., Chicago 1; or the Western office at 660 Market St., San Francisco 4.

Services previously unavailable are now offered. Not only does the plan provide, at a low cost, the cash with which contractors can complete purchase of equipment needed for the work on which they are to bid, but it also arranges for the repayment of the loan over a time sufficient to permit the equipment to pay for itself.

Distributors may make the service available to their customers through an installment-sales financing arrangement featured by extreme flexibility and freedom from interference with the terms under which the distributor continues to sell equipment. Under certain conditions the dealer is relieved of credit losses and contingent liability.

Under this plan, sales are turned into cash, collection and credit expense eliminated, and contingent liability avoided. The distributor is allowed an advance of 100 per cent on the sale. A down payment of 25 per cent is recommended, although smaller amounts will be considered. Similiarly, more time than the recommended 24-month maximum may be allowed. The rate, up to two years, is 6 per cent, simple interest.

Other features of the plan include wholesale facilities whereby C. I. T. will underwrite the purchase of new, used, or Government-surplus equipment, and an agreement whereby idle machinery may be put to work on a rental basis. This wholesale plan, which will make it possible to carry a more comprehensive stock, provides that, after a down payment against wholesale cost and freight charges, C. I. T. will finance the distributor's equipment purchases on a three-month basis, without amortization. It is renewable, subject to 10 per cent reduction of unpaid balance, for an additional three months. Simple interest at 4 per cent is charged, plus a service charge of ½ of 1 per cent on the unpaid balance for each three-month period.

The rental plan permits the purchasing of equipment for this purpose on a two-year basis at a 6 per cent rate. Rentals may be made on a daily, weekly, or monthly basis.

Turner Elects Directors

Two new directors, George F. Ferris of New York City and Francis B. Warren of Chappaqua, N. Y., have been elected by the Turner Construction Co., New York City. They succeed A. W. Chapman and T. A. Smith, who have retired after more than 28 years of service on the Board. From August, 1939, to May, 1944, Mr. Ferris, a Vice President of the firm, was Chairman of the Operating Committee of Contractors, Pacific Naval Air Bases. Mr. Warren has been Assistant Treasurer of the firm since 1941.

Singstad Opens Office As Tunnel Consultant

Ole Singstad, well known engineer engaged in subaqueous tunnel operations in New York City and elsewhere since 1909, retired from his position as Chief Engineer of the New York City Tunnel Authority on October 1. Serving first as designing engineer under the late Clifford Holland, he succeeded Mr. Holland as Chief Engineer of the Tunnel Commissions in 1925, and has been either chief engineer or consultant on most of the vehicular tunnels which have been built in this country since that time.

Mr. Singstad will continue his consulting engineering practice, with offices at 15 Whitehall St., New York 4, N. Y.

• HOBART BROTHERS CO., Box CE-115, TROY, OHIO
☐ Yes, we can use_____copies of this handy HOBART "Vest Pocket Guide for Arc Welders"
☐ Info on Welders ☐ Info on "Practical Design"
NAME
FIRM
ADDRESS

You get SPEED plus STRENGTH with "simplified" Arc Welding

Finish your repair jobs ahead of schedule with Hobart "Simplified" Arc Welding! Your welds are stronger, permanent. Ideal for building your special equipment and construction fabrication.

Remote Control gives the exact welding heat at the work, regardless of distance from the Hobart Welder. Speeds up work; guarantees correct welds.

"Practical Design for Arc Welding." Gives new ideas in arc welding procedure. Write for it.

HOBART BROS. CO., BOX CE-115, TROY, O.

"One of the World's Largest Builders of Arc Welders"
HOBART Simplified Arc Welders

Dependable Power Control Units for All Makes of Tractors

Smooth operating brake and clutch assemblies eliminate shocks and jerks; the large drums run cool; sheaves are designed to reduce wear on cables. Fingertip control gives fast response for bigger yardage. Designed for all types of cable-operated equipment, on all makes of tractors.

Write for bulletins.

A Heil Cable Dozer gives you faster action, greater flexibility and handles the tough jobs easily.

10 *reasons why* Heil Cable Dozers

move more "pay dirt" at less cost

1 The center-lift construction assures full visibility for operator. He works faster and more accurately, for 60% of moldboard is visible at all times.

2 Ease of operation is assured because control lever is located at driver's side.

3 Lifting mechanism is mounted on tractor frame—heavy reinforcing fish plates attached to transmission case and engine frame carry load of overhead center lifting mechanism.

4 Heil design transfers imposed load to dead axle — no strain on tractor frame.

5 Short push arms at center balance point provide greater down-pushing pressure on blade cutting edge.

6 Down pressure at center point of tractor keeps track at full length on ground, utilizing entire drawbar horsepower of tractor.

7 Blade can be disconnected from tractor easily. Simply remove one sheave pin and four small nuts—tractor can be backed away from blade with cable remaining intact.

8 Mounting frame leaves whole track frame clean — does not cause dirt to accumulate at idler rollers.

9 Fast mounting job is possible because Heil equipment has a minimum of pieces and weight. Parts are interchangeable—which means less inventory.

10 Heil streamlined design does not detract from the tractor's appearance. All functions are coordinated to give you smoother operation, quick response to controls, and a better, cleaner, all-around job of dirt-moving at lower cost.

See Your INTERNATIONAL TRACTRACTOR DISTRIBUTOR

R-55

ARMY E NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

Safety Stressed At Asphalt Plant

Plant Producing 650 Tons in 12 Hours Set Up in Large Quarry to Provide Hot-Mix for Resurfacing

AN asphalt plant convertible to either cold-mix or hot-mix was installed in the large commercial quarry of the Riverton Lime & Stone Co. at Riverton, near Front Royal, Va., by the American Asphalt Products Co. of Washington, D. C., to furnish the resurfacing materials for its maintenance contracts in the northwestern section of Virginia. This semi-portable Cummer plant uses crushed limestone from the adjacent quarry and sand trucked in. Both materials are stockpiled at one side of the plant, permitting filling of the feeder hopper by a Northwest crane handling a ¾-yard Hayward clamshell bucket.

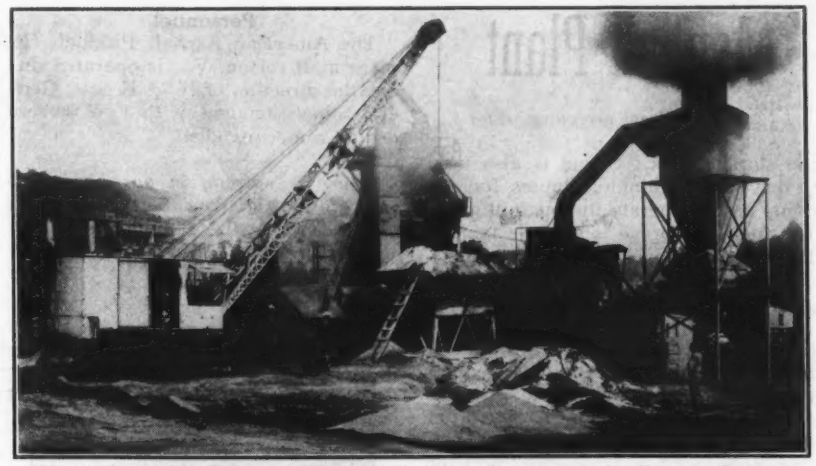
Safety Measures

The contractor is very safety-conscious, as is evidenced by the care taken in the disposition of the electrical controls for the plant as described later; the installation of substantial wood stairways with heavy hand-rails; sturdy platforms, also with adequate hand-rails; and a steel stairway with Diamond Grip safety treads and a pipe hand-rail from the ground to the mixer deck.

Handling Aggregates

The feeder hopper for the drier is the lower section of an old Blaw-Knox batching bin, mounted on structural-steel columns, over a Link-Belt apron feeder which delivers a measured quantity of sand and stone from the two-compartment hopper. The feeder is controlled by a jaw-clutch drive from the head shaft of the cold elevator to which the material is delivered by the apron feeder.

The drier is adequate for the plant, not requiring forcing to meet the 600 to 700-ton production in 12 hours. Originally designed for coal firing, the drier is 72 inches in diameter and 50 feet long. It is driven by an independent G-E 50-hp motor through a Morse solid-chain drive. All motors about the plant are 440-volt ac from a substation which also serves the needs of the lime plant. A mill exhaust-type Buffalo Forge Size 70 blower driven by a G-E 35-hp 750-rpm slip-ring motor with a G-E manual speed-control regulator for 100 to 750 rpm is mounted at the opposite end of the drier from the heating torches. The blower delivers the fines to a cyclone-type dust collector. When using limestone dust as a filler in the mix, there is an excess of 200-mesh and finer material beyond the needs for filler for top-course mix, so the contractor sells the extra fines caught in the dust collector back to the stone company for agricultural lime. When using sand, however, the excess fines are wasted as the per cent of lime is too low to permit their use for that purpose.



This semi-portable Cummer asphalt plant, set up in a quarry by the American Asphalt Products Co. to furnish materials for its resurfacing contracts in Virginia, produces from 600 to 700 tons per 12-hour day. Aggregates are handled by a Northwest crane and Hayward ¾-yard clamshell.

From the drier the hot aggregates are delivered to a 56-foot-high Link-Belt enclosed bucket elevator which carries them to a 3-deck Tyroc 4 x 10-foot vibrating screen. The top deck has ½-inch screen openings, the middle deck ¼-inch, and the bottom deck a No. 7 screen. The hot elevator is driven by a 20-hp G-E electric motor. The screened aggregates are stored in a 4-compartment bin, each section of which has a capacity of 15 tons. Two compartments carry ½-inch to No. 4 stone, one No. 4 to No. 7 (⅛-inch) stone, and the fourth, sand passing the No. 7 screen.

Asphalt and Fuel Oil

The AP-3 or AP-2 penetration asphalt used in Virginia Specification F-1, H-2, and H-3 binder and surface courses is delivered in tank cars to a spur immediately adjacent to the plant, with connections for heating three cars at one time with steam from a 60-hp horizontal oil-fired boiler. It also supplies steam for heating the 29,000-gallon asphalt storage tank, for atomizing the fuel oil for the drier burner, running the Kinney asphalt pump, and heating the jacketed asphalt line to the weigh bucket and the return loop to

(*Concluded on next page, Col. 2*)

Deep-hole drilling power and unusual flexibility result from using FM-2 Wagon Mountings equipped with the sturdy X-71WD Drill.

More feet of hole per shift from I-R Jackhamers, with their easy holding, high drilling speed and durability. There is a size and type for every drilling problem.

Record-breaking performance on tunnel jobs prove the durability and drilling speed of I-R Power-Feed Drifters—3, 3½ and 4-inch sizes.

You break concrete faster with I-R Paving Breakers. The popular "Cushioned-Air" feature prevents the piston from hitting the fronthead. There's less shock, less breakage, and lower upkeep. Made in 40, 60, and 80-pound sizes.

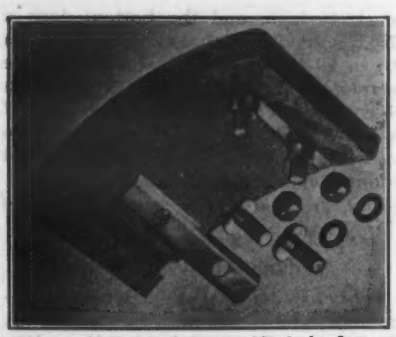
You get Air Power at lower cost from the Mobil-Air Compressor—the portable with the Drill-More Regulator—sizes 60 to 500 cubic feet per minute.

ROCK DRILLS
AIR TOOLS
COMPRESSORS
CONDENSERS
TURBO BLOWERS
CENTRIFUGAL PUMPS
OIL AND GAS ENGINES

Ingersoll-Rand
11 BROADWAY, NEW YORK 4, N. Y.

14-713

For 68 Years Builders of Fine WHEEL BARROWS:
AMERICAN
STEEL SCRAPER CO.
Sidney, Ohio
Watch for Post-War Models



The new Key-Lok brake block is featured by slots to fit in the brake bands.

Brake Block Speeds Job of Replacement

A heavy-duty brake block designed to slide into place instantly and easily has been developed by the Raybestos Division of Raybestos-Manhattan, Inc., Bridgeport, Conn. Eliminating the bolting operation in relining brakes, the new block, called Key-Lok, is made with lateral "fishtail" slots, or keepers, in which bolts are inserted, spaced to fit in the brake bands. These keepers slide into fishtail slots cut in the block. With this arrangement, the keepers or shoes need not be removed in relining. The keeper nuts are merely loosened slightly to slide the old blocks off and the new ones on. Other advantages pointed out by the manufacturer are the elimination of bolt holes which collect dirt and grit, increased friction surface, and the prevention of scoring.

Adaptable to both internal and external applications, Key-Lok is available for all molded Raybestos blocks. Further information may be secured direct from Raybestos by mentioning this item.

GMC Appointment

The appointment of Grant Sturgis as Development Engineer, Parts and Service Operations, for the GMC Truck & Coach Division of General Motors, was announced recently. Formerly Eastern Warehousing Manager for the Chevrolet Motor Co., Mr. Sturgis will direct the planographing of all parts activities and handle all field contacts on Division property, including repairs and maintenance. He will also handle dealer contacts for GMC Truck & Coach involving dealer plans for new building construction, remodeling, and general maintenance.

Asphalt Plant

(*Continued from preceding page*)

the storage tank. Steam is also used to drive a Worthington duplex fuel-oil pump and to operate the pugmill gates. The fuel-oil storage is a single tank of 14,000-gallon capacity.

Pugmill and Operation

The contractor replaced the standard asphalt weigh bucket with a McCarter bucket having 1-inch slotted openings to distribute the asphalt as a spray the entire length of the pugmill. The latter is driven by a G-E 75-hp 865-rpm electric motor with a Link-Belt reducing gear to turn the pugmill at 60 rpm.

A Howe dial scale reading to 5,000 pounds is used to weigh the aggregate and a similar 500-pound scale is used for the asphalt. The aggregates are mixed 5 to 10 seconds before the asphalt is added and then 35 seconds more to produce a homogeneous mix. The plant was built to handle 3-ton batches of cold-mix and since conversion to hot-mix the batches have been reduced to 2½ tons.

A separate room off the mixing platform contains all the switches for the various motors and a master switch with a lock so the Superintendent can be sure the current is off and that it cannot be turned on again while work is being done on the plant. Immediately behind the mixer operator on the operating platform is a set of push buttons controlling the starting and stopping of the various motors about the plant. Here also is a Durant counter operated by hand for tallying the batches dumped. This counter is set back to zero each morning when the plant starts operation.

The plant is completely shut down at night. A fireman goes on duty at 4 a.m. to fire up the boiler, and works till 2 p.m. when a second fireman comes on duty. The balance of the plant operating personnel comprises the mixer operator, crane operator, a feeder man and an oiler, a man in the office, and the Plant Foreman.

The contractor provides Winslow 25-ton platform scales where a state inspector weighs all loads going to the job from the plant. Hauling is done by trucks hired on a ton-mile basis and carrying 5 to 7½-ton loads, that is two or three batches.

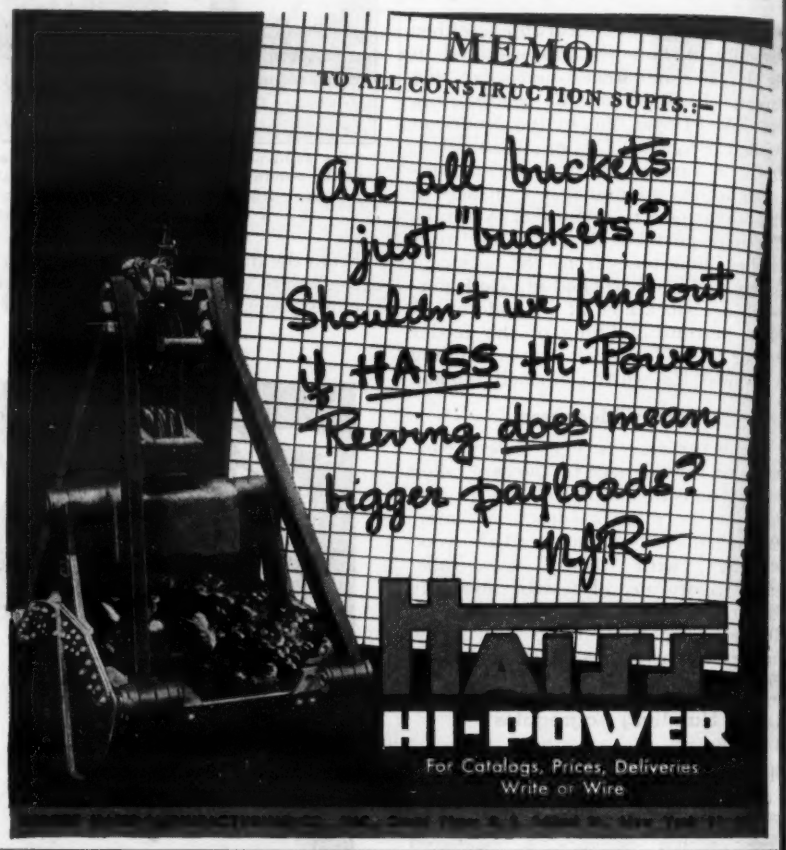
Personnel

The American Asphalt Products Co. plant at Riverton, Va., is operated under the direction of H. O. Freeze, General Superintendent, with J. W. Freeze as Job Superintendent.

There is nothing in our history to indicate that laws on the statute books are irrevocable. We should fight against evils and not be deterred by the fear that we may not win.

Chicago Pneumatic Names Coffey Vice President

Guy J. Coffey, since 1939 Manager of the Los Angeles district office of the Chicago Pneumatic Tool Co., of New York City, has been named Vice President in charge of sales for the organization, in line with Chicago's plans for expansion in the post-war field. A middle-westerner, Mr. Coffey joined the firm in 1933.


MEMO
TO ALL CONSTRUCTION SUPTS.:—
Are all buckets just "buckets"? Shouldn't we find out if HAISS Hi-Power Revving does mean bigger payloads?
MGR
HAISS
HI-POWER
For Catalogs, Prices, Deliveries
Write or Wire

Porto-Power ... Harnessed Hydraulic Power FOR 1001 TOUGH JOBS!
TOUGH jobs soften up quick—when Blackhawk Porto-Power gets at them with its tons of hydraulic power. Easily transportable by one man and operated by him with hair-trigger accuracy. It goes right to the job, and right to work. This "educated" hydraulic jack builds up into many combinations to push, pull, lift, clamp, spread, bend, and press—in any direction. Porto-Power Hydraulic Units are made today in 7, 10, 20, and 50-ton capacities. See your distributor about Blackhawk Porto-Power, Hydraulic Jacks and Wrenches.
A Product of BLACKHAWK MFG. CO., Dept. P1815, Milwaukee 1, Wis.
Porto-Power will "go to any length" to get the job done! Ordinary jacks have fixed heights and, for some jobs, must be built up with dangerous blocking that may buckle under pressure. But Porto-Power's steel extensions build up rigidly and quickly for any span, as shown above
Porto-Power Gives a precision push to a timber in shoring operation. No dangerous jiggling as with a mechanical jack. The pump is separate from the ram.
PUMP
RAM
SAFETY HOSE
TOE LIFT COMBINATION
Porto-Power takes a toe-hold, too! Equipped with a base-plate and toe, Porto-Power lifts and lowers machinery and heavy objects. Here, an S-78 lifts from a low of 3½" to an 8¼" height — so rollers can be shoved under this steam winch Safer, faster than mechanical jacks and crowbars.
BLACKHAWK

Clamp-Splice-Tie-Mend-Reinforce
with
PUNCH-LOK
Streamlined
BANDING METHOD
PUNCH-LOK
Streamlined
Punch-Lok Clamps, quickly applied with the Loking Tool, save money and time in your production and maintenance operations. Send now for descriptive catalog and name of nearest distributor.
KEEP BUYING WAR BONDS
PUNCH-LOK COMPANY
Dept. I, 321 No. Justine St., Chicago 7, Illinois

New Mile Levee Built Within Five Months

895,000 Yards of Earth Moved in Four Contracts With Tractors, Scrapers, Tower Machine, Draglines

CAVING of the bank along the east shore of the Mississippi River south of Baton Rouge, La., with threatened damage to the levee, necessitated the hurried construction of a new setback levee, 1.1 miles long, before high water in the spring might reach and possibly break through the present levee.

Work on this project, known as the Lopez Levee, was started with the construction of two wing levees extending inland from the north and south extremities of the section being menaced by the river. This work was done by the D. W. Winkelman Construction Co., Inc., of Syracuse, N. Y., between October 28 and December 22, 1944, under a contract awarded by the New Orleans District, U. S. Engineer Department. A contract was also let to the Sternberg Dredging Co. of St. Louis, Mo., to build a straight levee connecting the two ends of the wings, and work was started on this section November 11, 1944. In order to complete this job as quickly as possible, however, the Sternberg contract was modified and divided so that additional equipment could be put to work. A contract for a part of this straight-levee construction was awarded to the Walter P. Villere Co. of New Orleans, La., and the remainder was built by the U. S. Engineers themselves, using government equipment and hired labor.

The entire levee, consisting of 895,000 cubic yards of earth fill, was completed by February 28, 1945, in a trifle over four months from the time the first earth was moved in the wing-levee construction. Equipment used in this mass earth-moving project included trucks, tractors, scrapers, tower machine, and draglines.

Restless Muddy Waters

The Father of Waters, as the Indians called the Mississippi, rolls along apparently behaving itself as it makes a great bend to the east about 5 miles below Baton Rouge, Louisiana's capital. Actually, however, Ol' Man River has widened 500 feet within the last 50 years at the expense of the east bank, and a renewed flurry of caving last year reduced the distance between the bank line and the toe of the levee to a mere 90 feet in some places. The river's former rate of advance at 10 feet per year could not be depended on, once the waters had cut into the bank within the shadow of the long earth wall, as it did in the latter part of 1944.

Accordingly, the U. S. Engineers designed a new earth levee, the center line of which is now about 750 feet behind the center line of the existing levee which was built in 1929. This new Lopez Levee is 5,875 feet long, including the two wing sections, and completely buttresses the old levee in that area where the river is eroding the bank.

Building the Wing Levees

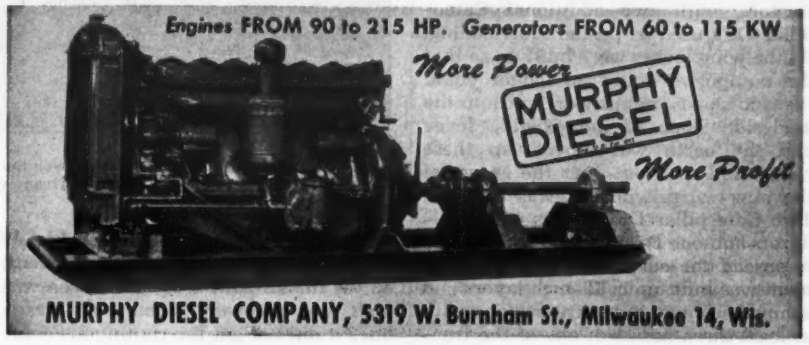
The wing levee at the upper end of the project makes a diagonal tie between the two roughly paralleling levees. It is 1,060 feet long, containing 15,000 cubic yards of fill or about 10,850 yards to the station. The lower wing is built at right angles to the two levees and is 1,015 feet long, containing 25,000 cubic yards of fill or about 12,300 yards to the station. This section also included 200 feet of straight levee to make a corner above the wing. The finished wing sections of the levee are 25 feet high with a 10-foot crown and were built to a gross grade of 50.5 mean sea level which compacted to a net grade of 47.0 mean sea level. The distance from toe to toe is 220 feet. The river-side slopes are 1 on 3½ to the ground surface and from there the upper wing has a 40-foot berm, at the end of which was the borrow area. Excavation was permitted on a 1 on 2 slope for a depth of 3 feet followed by a 1 on 10 slope. The lower wing has a 60-foot berm, at the end of which borrow material was taken on a 1 on 3 slope. The land-side slopes are flatter, being 1 on 5½ in both cases.

Although the D. W. Winkelman Construction Co. has its headquarters in New York State, it had recently built the Natchez, Miss., Airport, then got a contract to build a levee on the other side of the Mississippi at Ferriday, La., and when that was completed moved farther downstream to the Lopez location. The material available for the construction of the wing levees was a sandy loam which could be used to good advantage with the earth-moving equipment the Winkelman Co. had at hand. This material came from the river-side borrow below the upper wing levee and above the lower wing levee where there was a ridge of good earth.

Equipment Used

The excavating equipment included a Lorain dragline with a 50-foot boom and a 2¼-yard bucket, and a Caterpillar No. 48 elevating grader. The grader made a cut 8 to 10 inches deep over the borrow area, loading to seven 15-yard bottom-dump Euclids, powered by Cummins diesel engines. The dragline loaded three 10-yard rear-dump

(Continued on next page)


Engines FROM 90 to 215 HP. Generators FROM 60 to 115 KW
More Power
MURPHY DIESEL
More Profit
MURPHY DIESEL COMPANY, 5319 W. Burnham St., Milwaukee 14, Wis.

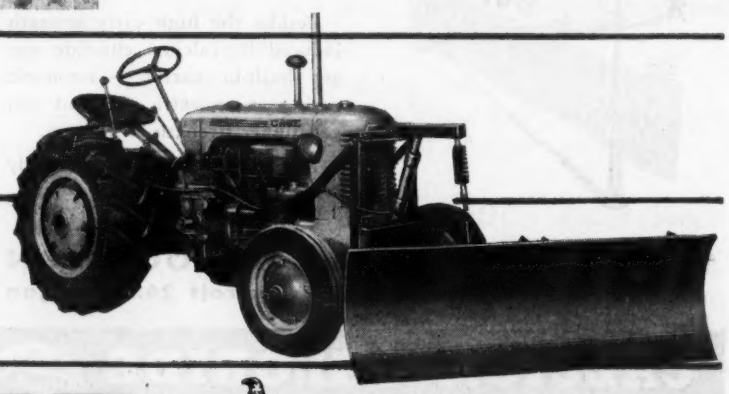
Stays Ahead of Snow

on the Sidewalks of New York

Along the winding walks and drives of a campus . . . as of the New York State college shown above . . . or on the cramped sidewalks of a city, it takes stamina behind the plow to stay ahead of snow. Eager power through a wide range of working speeds, sure-footed traction, compactness and stability, quick maneuvering, all help to make Case-powered plows the masters of snow. Above all is the extra endurance that enables Case industrial tractors to work on and on without pampering. Ask your distributor or write us about the four sizes and varied equipment available for them. J. I. Case Co., Racine, Wis.

Hydraulic-Lift Loader, plus the compactness and mobility of a Case industrial tractor, enables the outfit above to scrape, scoop and load snow swiftly into trucks without obstructing traffic in other lanes. It works from pile or windrow, makes quick work of clearing intersections and loading zones.

Many Types of Plows, in sizes to suit the four Case industrial tractors, are offered by distributors. At right is a one-way reversible blade with hydraulic control on the Model "SI." Other favorites are the curb-climbing sidewalk plow, V-plows, and highway plows for the mighty "LAI."



CASE

New Mile Levee Built Within Five Months

(*Continued from preceding page*)

Euclids. Other earth-moving equipment consisted of three LeTourneau 24-yard scrapers and one 14-yard LeTourneau pulled by four Caterpillar D8 tractors, with two additional Caterpillar D8's used as pushers for loading. As the wing levees were built up so that the equipment could no longer climb the side slopes, ramps were cut into the land-side slope of the existing levee and the earth was moved up these ramps and then out over the crown of the new wings where it was dumped. Two Caterpillar D8 tractors with bulldozers and one D7 with dozer were used to spread the earth fill. The embankment was built up in 12-inch layers and compacted over its entire surface with at least three passes of one of the tractor-dozers.

The average haul was 1,250 feet with a maximum haul of 2,500 feet. The Euclids, operating at an average speed of 8 mph, were used on the longer hauls, while the tractors and scrapers, operating at about 4 mph, were used on the shorter runs. The two wing levees, with a total of 240,000 yards of dirt, were built at a cost of $105,600. Wilford Anderson was Superintendent for the D. W. Winkelman Construction Co., Inc.

The Straight Levee

The 3,800 feet of straight levee is composed of 655,000 yards of fill and was built up from an average ground elevation of 22 to a gross grade elevation of 53.5. This was 3 feet higher than the gross grade of the wing levees, but as the straight section of levee was built with a tower machine and draglines it did not get the continuous compaction that the wings received during construction from hauling equipment rolling over it. This gross grade eventually settled to a net grade of 47.0, the same height as the wings. The 25-foot-high levee has a 10-foot crown with a land-side slope of 1 on 5½. On the river side it descends on a 1 on 3½ slope to a point 10 feet below the net crown elevation where a false berm was constructed as a further protection to the toe of the slope during high water. The distance across the base of the levee from the land-side toe to the river-side edge of the false berm is 265 feet. This berm has a downward slope of 1 on 10 for 40 feet, and then 1 on 3 until it meets the original ground surface. From here a flat true berm extends 20 feet, beyond which dirt could be excavated for the levee. Borrow was taken from this pit for the straight section of levee and was dug on a 1 on 2 slope for a depth of 3 feet and then down a 1 on 10 slope. On the other side of this borrow pit lay the existing levee and no material could be taken within 100 feet of its land-side toe. Outside this, excavation was on a 1 on 3 slope to a point where this grade met the 1 on 10 slope coming from the other side of the pit.

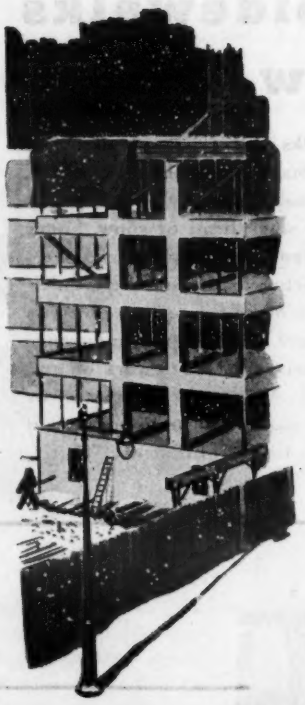
C. & E. M. Photo

The bucket on the Bucyrus-Erie tower machine used by the Sternberg Dredging Co. on its Lopez Levee contract moved 18 cubic yards of dirt.

Ordinarily, when levees are set back, the old levee is made available for use as borrow material in the construction of the new levee. In this case, however, the risk of rising waters was too great to warrant the removal of the existing levee, so all dirt had to come from the area between the two levees, although this material was not of the best quality for levee construction. The upper 8 to 10 feet from the borrow pits was a stiff, black clay in which, over the centuries, a large mass of vegetable matter had decayed. This soil is known as "buckshot" and beneath it was a stratum of silty clay with a very high moisture content that extended below the limits of the digging. The "buckshot" is bet-

(*Continued on next page*)

Stop WINTER LAG* IN CONCRETE



Winter Lag* is the progressively slower action of concrete in acquiring strength as the thermometer goes down.

Much of this Winter Lag* in concrete can be overcome by using calcium chloride in-the-mix. For instance, concrete containing 2% calcium chloride, exposed to 40° temperature, will acquire safe strength in practically the same time that plain concrete does at 70°. Used with other normal protection, concrete can be placed on favorable schedules all the year 'round. This is the least expensive as well as the most effective means of speeding up cold weather concrete schedules.

Besides the high early strength induced by calcium chloride you get built-in curing — automatic curing at no extra cost and you get higher strength *at all ages*.

Ask for our Bulletin 28, "Early Strength Concrete."

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Building • Detroit 26, Michigan

CALCIUM CHLORIDE
SPEEDS WINTER CONCRETE CONSTRUCTION

Now-You Can Again Specify BRIGGS & STRATTON "Air-Cooled Power"

Good news for designers, engineers, manufacturers, dealers and users alike. It means you can have — not "just gasoline engines" — but Briggs & Stratton "Air-Cooled Power."

Precision manufacture and constant advancements in design and engineering account for the brilliant record of well over 2-¼ Million of these trouble-free 4-cycle gasoline engines during 26 years of continuous production.

Only by specifying Briggs & Stratton "Air-Cooled Power" can you get all of the advantages which have earned for Briggs & Stratton unquestioned leadership as manufacturers of "the world's finest gasoline engines."

BRIGGS & STRATTON CORP., *Milwaukee 1, Wis., U. S. A.*

Air-Cooled Power

4 CYCLE BRIGGS & STRATTON GASOLINE ENGINES

New Mile Levee Built Within Five Months

(Continued from preceding page)

er material than the clay silt, so the contractors strove to get this down first as a foundation for the finer dirt which was harder to control in the fill. The clay silt would not "stand up" well until after it had lost some of its moisture content, which was another reason why the new levee had to have protection from the older levee until the new earth fill had compacted and settled into a homogeneous mass.

The Sternberg Contract

The upper 2,200 feet of straight levee, containing 380,000 cubic yards of fill, was constructed by the Sternberg Dredging Co. with a Bucyrus-Erie tower machine. This fast earth-moving outfit consists of a head tower 140 feet high, and a tail tower 30 feet high, located 650 feet apart and connected by a cable over which runs a square bucket having a capacity of 12 cubic yards water measure, or 18 cubic yards heaped load. This large bottomless bucket was pulled across the borrow pit from the tail tower, which was stationed at the land-side toe of the existing levee, to the head tower on the new levee. At the point of unloading, the operator in the head tower raised the bucket in the air, the load of fill was deposited, and the bucket ran down the cable by gravity to return to the borrow pit for another load. Both towers are on crawler treads and moved along the levee as the fill progressed.

At the beginning of these operations the head tower was placed within the base of the new levee to avoid tracking outside the right-of-way limit. From this position, sufficient material could be moved for later rehandling to complete the land-side slope. The wet borrow, however, began to slide and the tower machine could not operate on such a precarious foundation. The contractor was forced to move his machine back to the land-side toe of the new levee and work the head tower on the original ground surface. The tower machine piled surplus material on the river-side slope above the gross grade, as far up on the crown as was possible. Later a small dragline worked along the levee crown, transferring this surplus fill from the river-side slope to where it was needed on the land-side slope.

Operation of Tower Machine

A 1⅝-inch steel cable spans the distance between the two towers. The bucket travels on this trolley cable by means of a four-wheel pulley, or "bicycle", which is greased every 12 hours. The bicycle cable goes over a sheave at the top of the head tower, and then down to a drum where the slack is taken up. Two chains from the front of the bucket are attached to the hauling cable which enters the tower at a lower point and is connected to a drum which pulls in the bucket. A third drum operates a re-haul line which is used when the span is too great for the bucket to return far enough by gravity alone. It was not used on this work.

C. & E. M. Photo

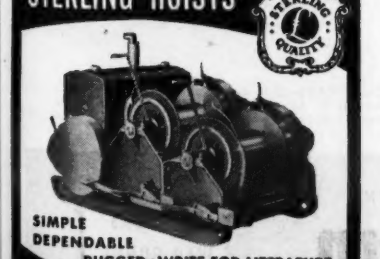
Walter P. Villere used a Bucyrus-Monighan 8-yard walking dragline to handle the 135,000 cubic yards for his section of the Lopez Levee. Here the Monighan starts to walk.

This head tower, weighing 550 tons, is the only piece of similar machinery on the river that has its own power unit; the others are operated by electricity and therefore can work only where a power line is nearby, somewhat restricting the scope of operations. This tower machine is powered by a Busch-Sulzer diesel engine, a 5-cylinder 2-cycle air-injection unit with an 800-hp rating. The engine drives a General Electric 500-kw 2,300-volt ac generator. An alternating instead of a direct-current generator is used because of its smaller size; a dc unit would occupy too much room in the limited quarters in the cab of the machine. From the generator, the power goes through a switchboard to a G-E 600-hp ac motor. Off this motor are dc generators which operate three G-E 187½-hp dc motors; the crawler treads of the machine are moved by one of these motors, while the trolley-cable drum and the bucket-cable drum are operated by the other two. Direct-current motors can pull a full load at slow speeds and will pull to a stall without danger of overheating and are therefore preferable in this type of work.

The tower machine carries a 3,000-

(Continued on next page)

STERLING HOISTS

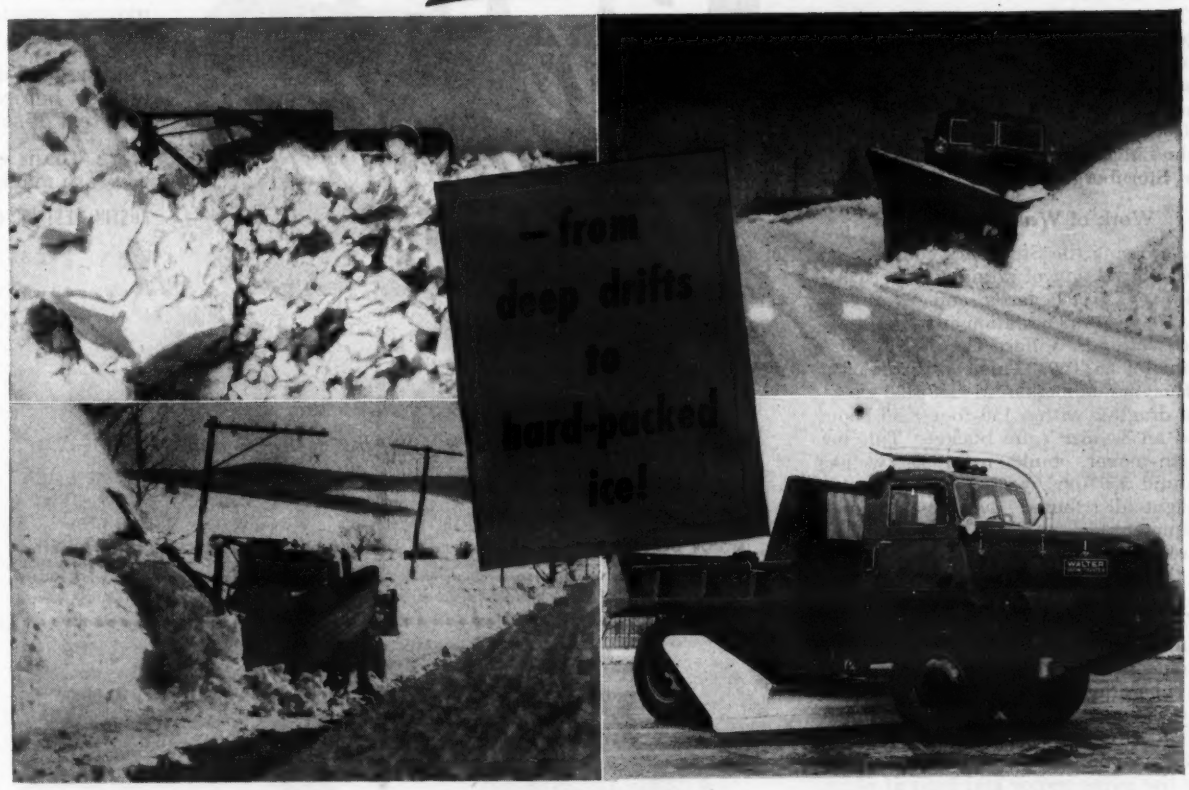


STERLING QUALITY

SIMPLE
DEPENDABLE
RUGGED • WRITE FOR LITERATURE

STERLING MACHINERY CORPORATION
405 Southwest Blvd., Kansas City

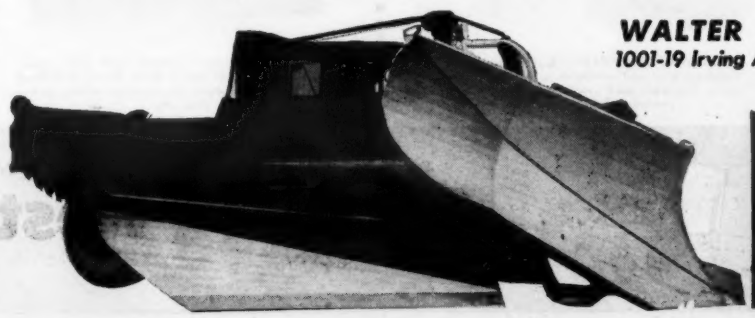
WALTER SNOW FIGHTERS
DO A *Complete* JOB!



Walter Snow Fighters not only handle every snow and ice condition—but do a fast, clean, thorough job on each run. Mounting the most efficient plowing equipment, Walter Snow Fighters throw snow farther on the opening run, reducing re-runs to a minimum. Snow is removed before it packs and freezes into dangerous ruts. Main highways are widened out sooner, permitting more time to clear secondary roads.

Only rugged Walter Snow Fighters have the power and traction to maintain maximum plowing speeds in deep snow or on slippery surfaces. This tractive power is supplied by the exclusive Walter Four-Point Positive Drive. FOUR driving wheels receive power according to their traction at any instant. There is no slipping, no stalling, no wheel-spinning to reduce speed. Only a straight, powerful driving-ahead that eats up the miles and cleans up the snow!

Write today for detailed information on the specialized engineering and construction that makes this performance possible, at lower-cost-per-mile.



WALTER MOTOR TRUCK COMPANY
1001-19 Irving Avenue Ridgewood 27, Queens, L. I., N. Y.

New Mile Levee Built Within Five Months

(*Continued from preceding page*)

gallon tank for diesel fuel, plus an overflow tank of 500 gallons and a day tank of 90 gallons which is kept filled by pumping from the main tank. The machine uses 40 gallons of fuel per hour. The engine is water-cooled by ninety sections of 6 x 40-inch radiators which are filled with water hauled from the river in barrels. Other radiators of similar size are used to cool the oil.

The tower moves on two rows of four treads each 42 inches wide. The span between the outside treads is 65 feet. A corduroy path of 12-inch willow and cottonwood trees was laid for the machine to crawl over. A Caterpillar RD8 tractor was used to build this log road and also, when equipped with a dozer, aided in placing and compacting the fill. From 8,000 to 8,700 yards of fill was placed in a 24-hour day by the tower machine. The crew for each of the three 8-hour shifts consisted of six men, the operator, engineer, oiler, tail-tower man, and two laborers to lay the corduroy mat. The big tower machine is moved about on the river from one job location to another on two steel barges, each 110 x 40 x 7 feet, welded together along the sides.

This part of the project, which averaged about 17,000 yards per station, was completed by the Sternberg Dredging Co. between November 11, 1944, and January 25, 1945. The cost of this 380,000 cubic yards of fill was $79,040. John McCarthy was Superintendent for Sternberg.

Work of Walking Dragline

Adjoining the Sternberg contract, an 800-foot section of straight levee, containing 135,000 yards and averaging 17,000 yards per station, was built by the Walter P. Villere Co. of New Orleans for $52,650. This contractor used a Bucyrus-Monighan Model 6150 walking dragline with a 150-foot steel boom and an 8-yard Yaun bucket. This big earth-mover, built in 1929, weighs around 550 tons, yet so evenly is this weight distributed over its 36-foot-diameter steel "tub" that the unit pressure on the ground is about 6 pounds to the square inch, the same as that of an average man.

The Monighan is powered by a Fairbanks-Morse 5-cylinder 300-hp diesel engine and has a crew of three men, an operator, oiler, and ground man, per 8-hour shift. Additional equipment within the cab includes a G-E 125-kw generator, to furnish power for the swing motor and light at night, for the Monighan works a 24-hour day.

This machine has a capacity of 10,000 yards a day but on this project, where the material had to be handled twice, the average was only 5,000 yards. The dragline started at the edge of the borrow pit near the old levee and worked the dirt back towards the new levee, but as the distance from the outer limits of the borrow pit to the center line of the new levee averaged 500 feet, the machine had to move back and rehandle this material before it reached its final position in the new fill. Because of the soft, spongy ground the dragline operated on wooden mats which were moved ahead by the boom. The levee was compacted and the slopes dressed by a Caterpillar D8 tractor, which also once a day brought fuel oil to the dragline in barrels pulled on a 15 x 10-foot wooden skid.

This section of levee was built between December 28, 1944, and February 1, 1945, with Walter P. Villere directing the operations of his company.

U. S. E. D. Section

The remaining 800 feet of straight levee with a total of 140,000 yards of fill was built by Government equipment and hired labor under the supervision of the U. S. Engineers. The U. S. B-13, a Bucyrus-Erie steam dragline, Class 180, part of the equipment of the New Orleans Engineer District, was used on this section. Built in 1918, this dragline was originally equipped with a 125-foot steel boom which had been replaced by a 160-foot aluminum boom with a 6-yard Bucyrus-Erie bucket.

The B-13 is powered by a 185-hp boiler, fired by fuel oil, which furnishes steam for the main engine. This engine operates the bucket, hoist, and drag cables, and propels the dragline on its tracks. The boiler also furnishes steam for an auxiliary engine which swings the dragline on its base. Another engine driven from the same power plant operates a 7.5-kw generator set for lighting the working area at night. A Kohler 5-kw light plant driven by a gas engine is kept in reserve.

The B-13 operates on two 4-foot-

(*Continued on next page*)

This One Will Stay On the Job Longer

Often a good cutting torch prevents a costly shut-down of operations.

You cannot purchase a more dependable cutting torch—or one of wider range—than Victor.

Victor Equipment Company
844 FOLSOM STREET
SAN FRANCISCO 7

VICTOR

Ad 104

BUILT to outperform

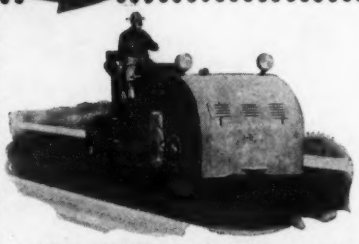
Exclusive features that save time and money by getting the job done better and quicker. "Plus values" built into every Austin-Western machine . . . values accumulated by engineering experience that has lived close to road building and earth moving problems and practices since the first crude Austin-Western tools of 1859.

Features of design and construction "job tested" before the war . . . that met the acid test of service on far-flung war fronts.

More than ever your post-war Austin-Western machine is "Built to Outperform".

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

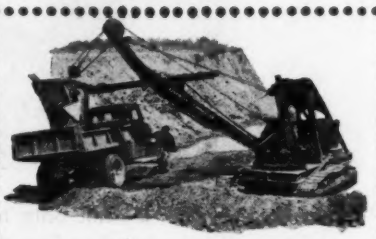
MOTOR GRADERS—Exclusive All-Wheel Drive and All-Wheel Steer enables the "99-M" and "88-M" completely to outperform ordinary motor graders.



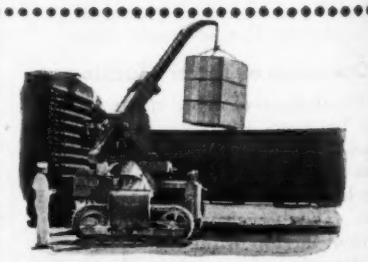
TANDEM ROLLERS—Made in 2 sizes—5 to 8-Ton and 8 to 10½-Ton. The variable weight feature enables one machine to handle a wide variety of jobs.

3-WHEELED ROLLERS—Made in sizes ranging from 6 to 12 tons. Gasoline or diesel engines. Hydraulic power steer. Hydraulic scarifier attachment.

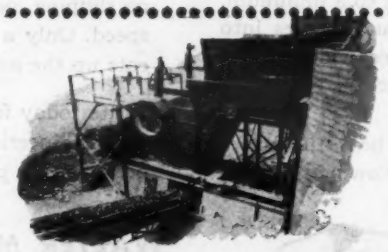
PATROL SWEEPER—Compact, simplified, quick-dumping. Rear broom throws dirt directly into hopper. May be had with Leaf Broom attachment.



BADGER SHOVEL—Convertible to crane, dragline, piledriver, trench hoe, and skimmer. ¾-swing design has many operating advantages.

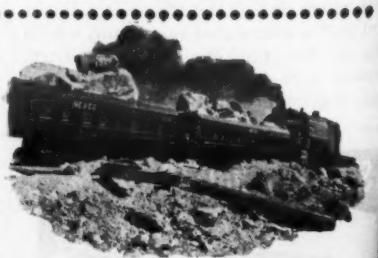


HYDRAULIC CRANE—Retractable-extensible boom provides ability to lift and carry maximum load under such handicaps as low doors and ceilings, inside box cars, etc.



CRUSHING EQUIPMENT—Roller bearing jaw crushers and roll crushers in a wide variety of sizes. Portable and semi-portable crushing and screening plants for all purposes.

TRAIL CARS—Hopper-bottom and side-dump types. Designed for heavy duty haulage behind powerful truck-tractors, in open pit mines, quarries, etc.



DUMP CARS—Side-dump models built in capacities up to 50 yds. (level full), and 90 tons; in standard, narrow and foreign track gauges. Also hopper type, bottom-dump cars.

ARMY E NAVY

Austin-Western

BUY MORE WAR BONDS

The U. S. E. D.'s Bucyrus-Erie steam dragline, with 160-foot aluminum boom and 6-yard B-E bucket, which built 800 feet of the Lopez Levee, lays its own tracks.

New Mile Levee Built Within Five Months

(*Continued from preceding page*)

gage tracks spaced 24 feet between center lines. The track is built in 15-foot sections each weighing 5 tons and is made up of 90-pound rails supported on 12-inch I-beams which in turn rest on 8 x 10-inch wood ties 10 feet long. The track, of which there is 180 feet, is set a section at a time by the boom of the B-13. When the dragline is working, the wheels are held firmly in place on the track by clamps driven against the rail with a tapered wedge.

This machine operated by making a cut in the borrow pit 150 feet wide for the length of its levee section, depositing this material as far back as the boom could swing, then moving along its track to a Y turnout and moving in about 150 feet towards the levee to another section of track.

All material had to be handled at least twice in the building of this section of levee which was constructed in two lifts. The entire length was first built to the height of the top point on the false berm, and when this was well compacted the upper part of the levee was brought up to grade.

Supplies Piped In

Water for the boiler on the B-13 was pumped from the Mississippi by a 2-inch Moyno pump driven by a Hercules 30-hp gas engine. From a reducer on the pump the water traveled through 2,000 feet of 1½-inch wrought-iron pipe, laid on the ground, to the dragline where a connection was made to the boiler with 100 feet of cotton hose. Fuel oil for the boiler was pumped from a barge on the river by a 4-inch Moyno pump driven by a 60-hp Hercules gas engine. From a reducer on the pump the oil was sent through 2,000 feet of 2½-inch wrought-iron pipe, then through a 50-foot length of metallic hose to the tank on the dragline. A small coal-burning boiler on the barge heated the oil to make it flow readily through the pipe line.

Forty men were employed, working the three 8-hour daily shifts during which an average of 5,000 yards was moved. A Caterpillar D7 with dozer helped the dragline shape up and compact the fill with at least three runs over each 12-inch layer. In the spring the slopes were sodded by hand labor using round pointed shovels to dig holes 3 to 4 inches deep in which 4 x 4-inch pieces of sod were placed on 18-inch centers.

The B-13 is transported on a barge, 120 x 60 x 7 feet, after a hole has been opened in the levee through which the tracks can be laid to the edge of the river. The dragline can lay 100 feet of double track in an hour. When it reached the existing levee, it opened a cut about 60 feet wide, and after it passed through it, closed the levee again.

Government forces started work on this section, which averaged 17,500 yards per station, on November 20, 1944, and completed work on January 27, 1945. F. Zuber was Superintendent in charge of operations.

Inspection Ditch; Subsidence Plates

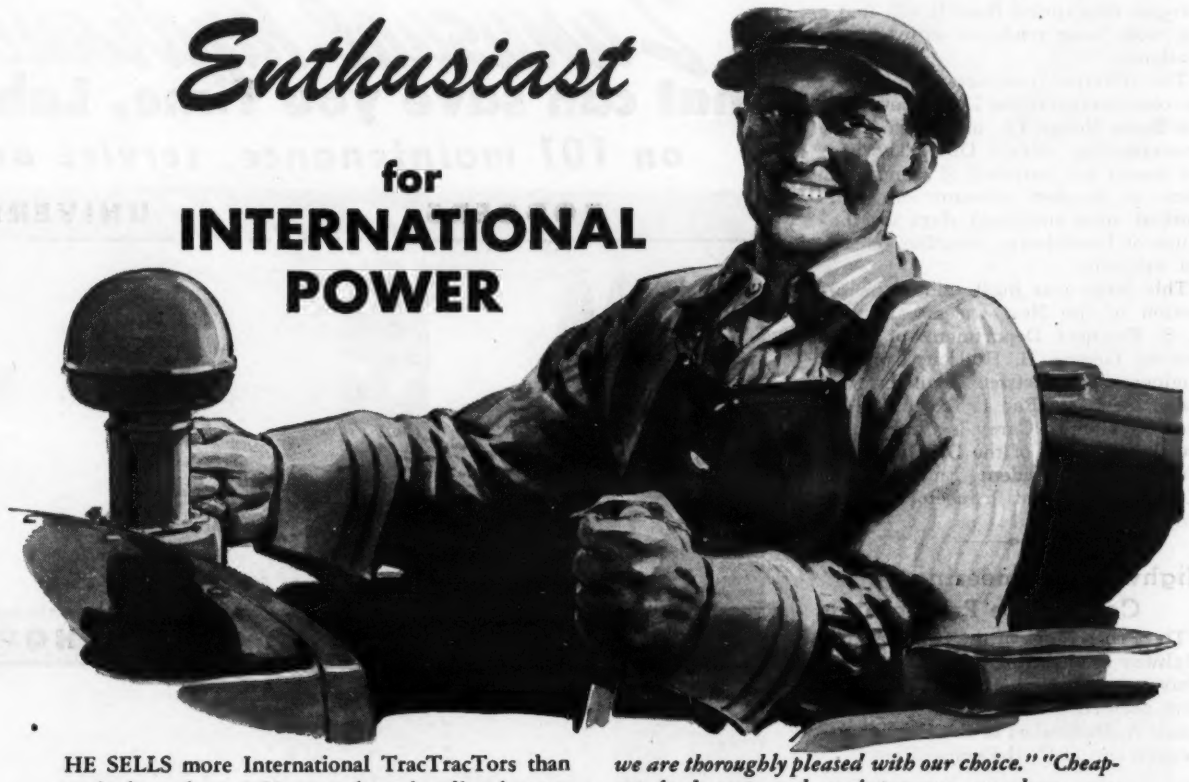
A 6-foot-deep x 7-foot-wide inspection ditch was dug the length of the levee to uncover any abandoned pipe lines, sewers, etc., that might lead water under the levee. If any trees were found buried, they were also removed. This ditch was dug 30 or 40 feet off the center line so as not to interfere with the setting of subsidence plates which were installed by each contractor to assure his getting paid for material which he had placed but, because of settling, might not be in evidence on the final sections.

These subsidence plates are 4 feet square, made of two thicknesses of 1-inch boards cross-lapped and nailed together. Two stakes driven on each side hold them in position during the filling operations. The plates are placed on the ground along the levee center line at 200-foot intervals, and also under the false berm. As the levee construction progresses, a ⅜-inch round pipe is driven or probed through the fill to the top of these plates which have been carefully referenced with transit

(*Concluded on next page*)

STOP WINTER DELAYS
Get Summer Efficiency with Aeroil
Concrete Heaters
Water Heaters
Salamanders
Thawing Torches
- ALSO -
. . . Kettles for Tar, Pitch and Asphalt . . .
Emulsion Distributors . . . Power Sprays . . . Weed Burners
Lead Melting Furnaces . . . Torches and Burners
Send for FREE Bulletin No. 101C
AEROIL PRODUCTS COMPANY
West New York, New Jersey
Chicago, Ill., San Francisco, Calif., Dallas, Texas

Enthusiast
for
INTERNATIONAL
POWER



HE SELLS more International TracTracTors than anybody we know! He runs them, handles the controls—knows, first hand, what International Crawler performance means.

And he's not backward about saying what he thinks about his power-packed prime mover, good or bad.

Find him where the tough, grubby jobs are getting done—on highway, airport and construction projects—at mill yards or with municipal crews. And listen!

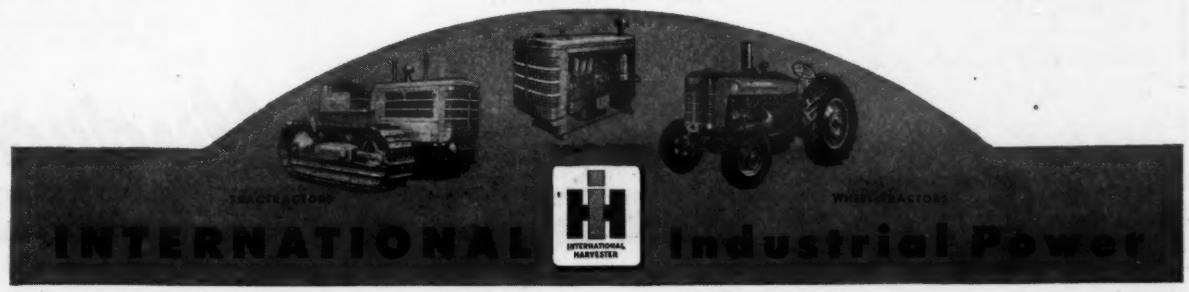
Hear him tell what *his* International can do, how it pays off in lower costs on every job, how he can beat the other fellow with it in climbing, turning, digging, carrying and hauling.

And the outfit he works for backs him up with statements like this: *"It's a powerful tractor with all the speed and dependability we need. This is our first experience with International Power and we are thoroughly pleased with our choice." "Cheapest fuel cost and maintenance we have ever experienced."*

International Industrial Power Distributors have all information about International Diesel and carburetor-type TracTracTors, Wheel Tractors and Power Units. For help in selecting the size and type of power equipment that will serve you best, talk with the distributor near you.

Dependable after-sale service is provided all owners of Internationals by distributors and dealer organizations that span the continent and circle the globe. Factory replacement parts and equipment built for use with International Tractors and Power Units are available through these organizations. This assures maximum value and long term benefits for owners and operators everywhere.

Industrial Power Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois



New Mile Levee Built Within Five Months

(Continued from preceding page)

lines. Elevations are taken on the top of the pipe, which has a known length, and thus the amount of subsidence in any section of levee can be readily determined. In portions of the Lopez Levee the subsidence was as much as 3 to 4 feet.

Personnel

The objective of completing the new levee before high water should threaten was realized when the earth embankment was in place by February 28, 1945. The slopes then received their final dressing, and sodding was done in the spring when the weather permitted. Although the 1929 levee had never been topped, floods had dashed against it and, with the river encroaching at its toe, the security of the countryside was threatened. The old levee will be left in place but should the river break through in a spring flood it will find a big, new levee ready to withstand its challenge.

The different contracts involved in the construction of the Lopez Levee below Baton Rouge, La., are shown in the accompanying table. Obviously it is not meant for purposes of comparison since a detailed account of hours worked, men employed, days lost because of breakdowns, weather, etc., is not available.

This levee was built under the direction of the New Orleans District, U. S. Engineer Department, of which Colonel George H. Hudson, Corps of Engineers, is District Engineer, and Major A. H. McRae is Executive Officer. Walter C. Carey is Chief of Inspection Division of the District. J. O. Wright was Resident Engineer and H. Frost, Resident Inspector, on the project.

Various Sections Included in Lopez Levee

Contractor	Earth-Moving Equipment	Time (Days)	Length (Feet)	Yardage (Cu. Yds.)	Amount
D. W. Winkelman Construction Co., Inc., Syracuse, N.Y.	Trucks, tractors, scrapers, elevating grader, dragline	56	2,075	240,000	$105,600
Sternberg Dredging Co., St. Louis, Mo.	Bucyrus-Erie tower machine, 12-yard bucket	76	2,200	380,000	79,040
Walter P. Villere Co., New Orleans, La.	Monighan dragline, 8-yard bucket	35	800	135,000	52,650
U. S. Engr. Office, New Orleans District	Bucyrus-Erie steam dragline, 6-yard bucket	69	800	140,000	no record
Totals			5,875	895,000	

Highway Engineering Conference Proceedings

The Proceedings of the Sixth Annual Highway Engineering Conference at the University of Utah, March 5-6, 1945, have been compiled and edited by Professor A. Diefendorf of the University's Department of Civil Engineering.

The 67-page booklet includes the following papers: "Post-War Highway Program", by Hon. J. W. Robinson, Congressman from Utah and Chairman of the House Roads Committee; "Highway Subdrainage and Base Drainage", by H. E. Cotton, Drainage Engineer, American Rolling Mill Co.; "Centrifugal Reinforced-Concrete Pressure Pipe for Water Supply Lines", by Elmer L. Johnson, Concrete Conduit Co.; "The Maintenance of Paved Surfaces in the Ninth Service Command", by Major N. H. Truax, U. S. Engineer Corps., with a discussion of this paper by Col. L. V. Sheridan, C. E.; "Timber and Highway Structures", by T. K. May, West Coast Lumbermen's Assn.; "Timber-Connector Highway Structures", by Alden K. Smith, Timber Engineering Co.; and "Post-War Highway Construction; Federal-Aid Highway Act of 1944", W. L. Anderson, Chief Design Engineer, State Road Commission of Utah.

Interested state and county highway engineers may secure copies of these Proceedings by sending their requests direct to Professor A. Diefendorf, Department of Civil Engineering, University of Utah, Salt Lake City.

Two New Trenchers Announced by Parsons

Two new Trenchliners, one a wheel type and the other a ladder type, have been announced by the Parsons Co., Newton, Iowa, manufacturer of Trenchliners for 40 years. They are the Model 200 Wheel Trenchliner, and the 221 Ladder Trenchliner, the latter being a smaller edition of the Parsons 250.

With its wheel pivot-mounted to the frame, and the dirt-catching slide tracks eliminated, the Model 200 will dig to a depth of 5½ feet in 15 to 26-inch widths at speeds ranging up to 118 inches per minute. Two double-wheeled dollies support the wheel bottom.

The Parsons 221, a ladder-type machine, digs up to 8 feet deep, in widths of 16 to 36 inches. It is equipped with a telescoping shiftable boom, the Parsons arched frame, and the direct power-flow arrangement.

Complete data on both new Trenchliners are contained in descriptive bulletins obtainable from The Parsons Co.

LINN HAFTRAK
SINCE 1916

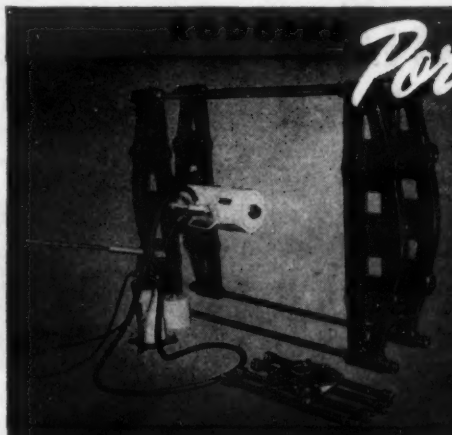
Low Cost Per Ton-Mile
Manganese Tracks
Contour-following Traction
Sturdy Construction
5 to 50 Tons Capacity
Negotiates Steep Grades, Mud, Snow and Ice

For
Mining • Quarrying • Logging
Snow Plowing • Dam, Highway, Airport and Oil Field Work

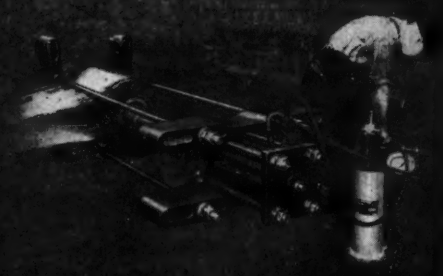
The Linn Manufacturing Corporation
Morris, New York
Designers and Builders of OFF-THE-HIGHWAY Vehicles

2 unusual hydraulic presses
that can save you Time, Labor and Trouble
on 101 maintenance, service and special jobs.

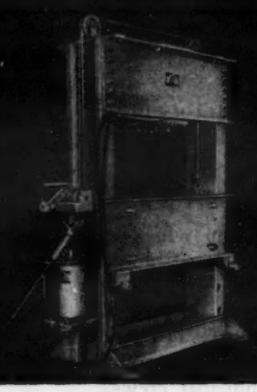
RODGERS UNIVERSAL PRESS
Portable



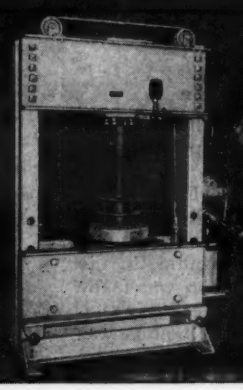
Left: Here is a Rodgers 200 ton Universal with back plate and rods shown beside it. At right is a Rodgers Universal mounted around a large pitman to pull the shaft. Real power—easy to use!



RODGERS SHOP PRESS
Flexible



Left: A Rodgers 100 ton Shop Press—study its simplicity—note pins below bed for increasing opening—hand pump mounted on side. Right: A bushing is easily pressed into a sheave with a few strokes of the hand pump.



STOP and think of all the uses you can find for these versatile Rodgers Presses — pulling gears, pinions and wheels; pressing shafts, bushings and pins, squeezing, clamping and jacking operations —wherever you need 50 to 200 tons of easily-applied hydraulic power.

The Rodgers Universal is a unique portable unit for field or shop service. It is used on a stand as an ordinary press, on its side or flat and is easily assembled around equipment for special operations. Rodgers Hydraulic Hand Pump or Power Pump supplies power.

A Rodgers Shop Press is a flexible unit with a bed that is easily raised or lowered to accommodate various size work. Cylinder may be adjusted across entire width of bed. Rodgers Hand Pump or Power Pump furnishes pressure.

If you have equipment to service you can save yourself hours of time and labor with a Rodgers—they often pay for themselves on a tough job or two. Write for *all* the details. It will be profitable.

Send for this new catalog . . .

It will give you complete information on Rodgers Hydraulic Presses. No obligation, of course. Write today.

Rodgers Hydraulic, Inc.
hydraulic power equipment
7415 Walker St., St. Louis Park; Minneapolis 16, Minn.

Shop Presses

Crawler-Track Presses

Portable Presses

Power Pump Units

Deepest Bridge Pier For 2,764-Foot Span

(*Continued from page 2*)

giving a bearing of 13 tons per square foot.

Superstructure

The prefabricated superstructures for the spans were made at the New South Wales Railway workshops at Chullora and were assembled on a "yard room" dug into the stone cliffs on the river bank. In this stone, two docks were excavated to enable the finished spans to be floated from the riverside to their appointed places in the structure.

The steel trusses, or spans, were designed for a maximum wind pressure of 30 pounds per square foot, equivalent to approximately an 80-mile-per-hour gale, the river valley in this section being subject to brief but violent windstorms on occasion. An idea of the strength that has been imparted to the structure on this account can be gathered from the fact that there are 180,000 rivets in the longer spans and 106,000 in the shorter ones.

When the spans were riveted together at Hawkesbury River, the underside of the structure was 15 feet above high-water mark. But as a clearance of 40 feet has to be maintained under the new bridge at high-water spring tide, it was necessary to lift the span up bodily another 25 feet before moving it out in the stream onto its piers. To effect this raising of the span, steel lifting towers were designed and fabricated by Australian engineers at Chullora. Each of these towers weighs approximately 230 tons and is 55 feet high. The raising of the truss is accomplished in five consecutive lifts of 5 feet each. Temporary trestles are then placed under each end of the truss to support it until it is lifted off by pontoons.

To carry the spans out to their resting places, two pontoons, 100 feet long, 40 feet wide, and 8 feet deep, are used. On the decks of the pontoons heavy trestling, constructed of Australian hardwood, is erected. These are approximately 40 feet high. On the decks of each pontoon are two long cylindrical steel tanks, 9 feet in diameter, each capable of holding 150 tons of water.

On the date selected for floating a span out to the piers, the two barges, their tanks filled with 300 tons of water, are floated into the docks at low tide during the night. The water is then emptied out of the tanks and, as the pontoons rise in the water, the tops of the timber trestles engage the underside of the truss at eight points, four over each pontoon. The trestles are made fast to the steel truss and, as the tide continues to rise, the truss is lifted off the temporary trestles on which it has been resting. When the truss has been lifted 3 inches above the temporary trestles, the pontoons are then hauled out of the docks into the river by hand winches. Steam winches attached by steel wire cable to piles spaced across the capricious and dangerous river then pull the structure out to its position on the bridge. With feet to spare, the span is swung over the piers and is secured in exact position by steel cables. With the dropping of the tide, the truss settles firmly in place.

New Chemical Weed Killer

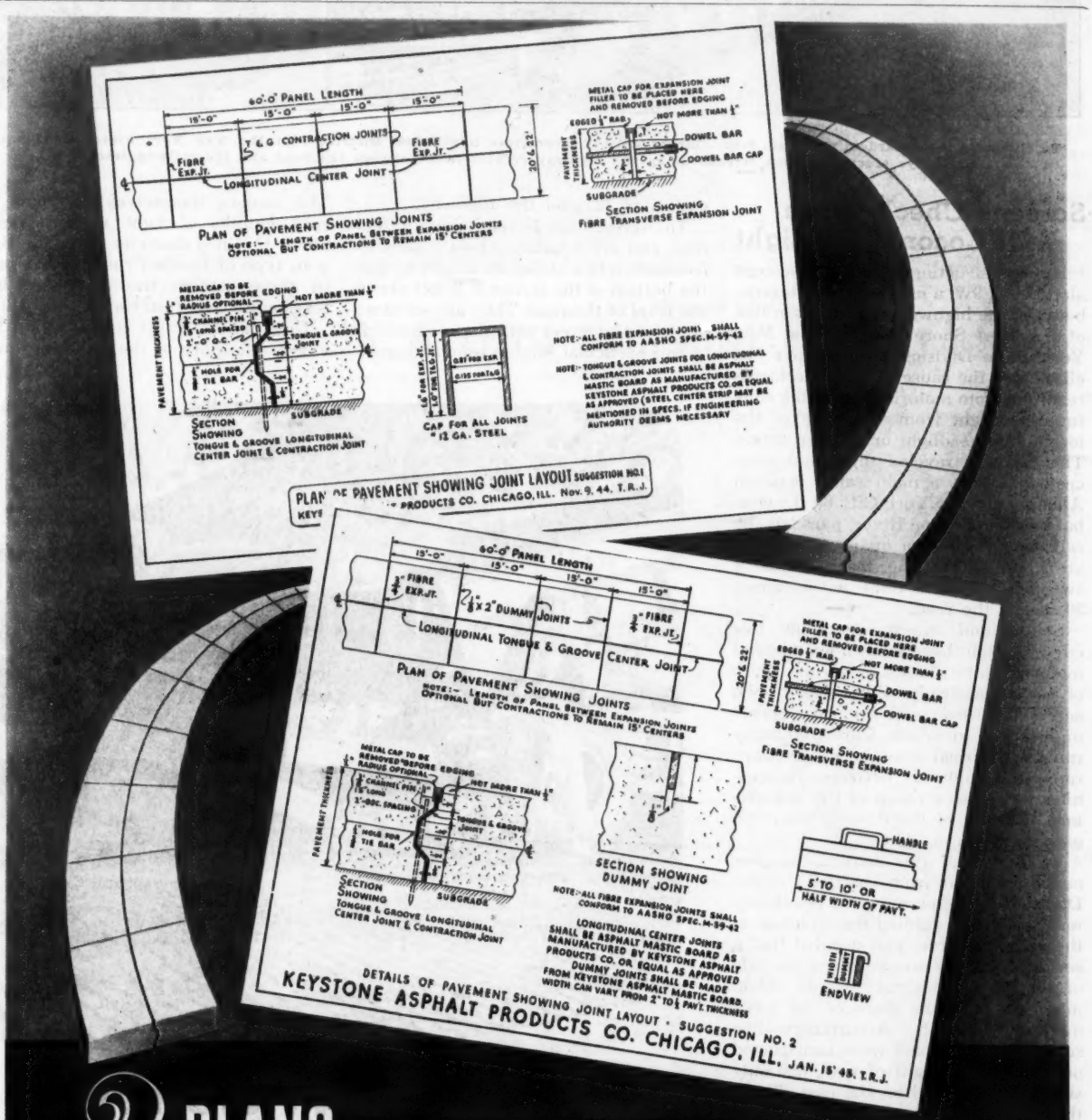
A new chemical weed killer has been developed at the University of California's College of Agriculture, Davis, Calif., Professor A. S. Crafts reports in *Aminco Laboratory News*, Vol. 2, No. 4. Emulsified with some oil and much water, the killer, known as 2.4 dinitro 6 secondary butyl phenol, has been found very effective against weeds that resist 2,4-oil sprays now in use. It is less inflammable and less expensive to transport than oil, and safer than arsenical weed killers in areas where livestock is pastured, the report claims.

Compounded with oil and suitable emulsifiers, this material forms the basis for a general contact herbicide manufactured by the Dow Chemical Co., Midland, Mich.

Price Reductions Made In Steam Cleaning Unit

Substantial price reductions in all standard models of the Hypressure Jenny instantaneous steam cleaner have been announced by the Homestead Valve Mfg. Co. of Coraopolis, Pa. Used in the maintenance and restoration of tanks, trucks, planes, and mobile artillery during the war, Hypressure Jennys are now returning to their normal role of cleaning machinery, engines, chassis, parts, buildings, etc.

Proportionate price reductions have also been made on parts and accessories in keeping with the company policy to pass savings along to the user.


60'-0" PANEL LENGTH
15'-0"
15'-0"
15'-0"
15'-0"
T & G CONTRACTION JOINTS
FIBRE EXP. JT.
FIBRE EXP. JT.
LONGITUDINAL CENTER JOINT
20'& 22'
PLAN OF PAVEMENT SHOWING JOINTS
NOTE:- LENGTH OF PANEL BETWEEN EXPANSION JOINTS OPTIONAL BUT CONTRACTIONS TO REMAIN 15' CENTERS
METAL CAP FOR EXPANSION JOINT FILLER TO BE PLACED HERE AND REMOVED BEFORE EDGING
EDGED ¼" RAD.
NOT MORE THAN ¼"
DOWEL BAR
DOWEL BAR CAP
PAVEMENT THICKNESS
SUBGRADE
SECTION SHOWING FIBRE TRANSVERSE EXPANSION JOINT
METAL CAP TO BE REMOVED BEFORE EDGING
RADIUS OPTIONAL
NOT MORE THAN ¼"
¾" CHANNEL PIN 18" LONG SMOOTH
2'-0" O.C.
TONGUE & GROOVE JOINT
HOLE FOR TIE BAR
SECTION SHOWING TONGUE & GROOVE LONGITUDINAL CENTER JOINT & CONTRACTION JOINT
SUBGRADE
CAP FOR ALL JOINTS
12 GA. STEEL
NOTE:- ALL FIBRE EXPANSION JOINTS SHALL CONFORM TO AASHO SPEC. M-59-42
NOTE:- TONGUE & GROOVE JOINTS FOR LONGITUDINAL & CONTRACTION JOINTS SHALL BE ASPHALT MASTIC BOARD AS MANUFACTURED BY KEYSTONE ASPHALT PRODUCTS CO. OR EQUAL AS APPROVED (STEEL CENTER STRIP MAY BE MENTIONED IN SPECS. IF ENGINEERING AUTHORITY DEEMS NECESSARY
PAVEMENT SHOWING JOINT LAYOUT SUGGESTION NO.1
PRODUCTS CO. CHICAGO, ILL. Nov. 9, 44. T. R. J.
60'-0" PANEL LENGTH
15'-0"
15'-0"
15'-0"
15'-0"
¾" FIBRE EXP. JT.
2" x 2" DUMMY JOINTS
¾" FIBRE EXP. JT.
LONGITUDINAL TONGUE & GROOVE CENTER JOINT
20'& 22'
PLAN OF PAVEMENT SHOWING JOINTS
NOTE:- LENGTH OF PANEL BETWEEN EXPANSION JOINTS OPTIONAL BUT CONTRACTIONS TO REMAIN 15' CENTERS
METAL CAP FOR EXPANSION JOINT FILLER TO BE PLACED HERE AND REMOVED BEFORE EDGING
EDGED ¼" RAD.
NOT MORE THAN ¼"
DOWEL BAR
DOWEL BAR CAP
PAVEMENT THICKNESS
SUBGRADE
SECTION SHOWING FIBRE TRANSVERSE EXPANSION JOINT
METAL CAP TO BE REMOVED BEFORE EDGING
RADIUS OPTIONAL
NOT MORE THAN ¼"
¾" CHANNEL PIN 18" LONG
2'-0" O.C. SPACING
TONGUE & GROOVE JOINT
HOLE FOR TIE BAR
SECTION SHOWING TONGUE & GROOVE LONGITUDINAL CENTER JOINT & CONTRACTION JOINT
SUBGRADE
SECTION SHOWING DUMMY JOINT
NOTE:- ALL FIBRE EXPANSION JOINTS SHALL CONFORM TO AASHO SPEC. M-59-42
LONGITUDINAL CENTER JOINTS SHALL BE ASPHALT MASTIC BOARD AS MANUFACTURED BY KEYSTONE ASPHALT PRODUCTS CO. OR EQUAL AS APPROVED
DUMMY JOINTS SHALL BE MADE FROM KEYSTONE ASPHALT MASTIC BOARD. WIDTH CAN VARY FROM 2" TO ½ PAVT. THICKNESS
HANDLE
5' TO 10' OR HALF WIDTH OF PAVT.
WIDTH OF PAVEMENT
END VIEW
DETAILS OF PAVEMENT SHOWING JOINT LAYOUT · SUGGESTION NO. 2
KEYSTONE ASPHALT PRODUCTS CO. CHICAGO, ILL. JAN. 15' 45. T.R.J.

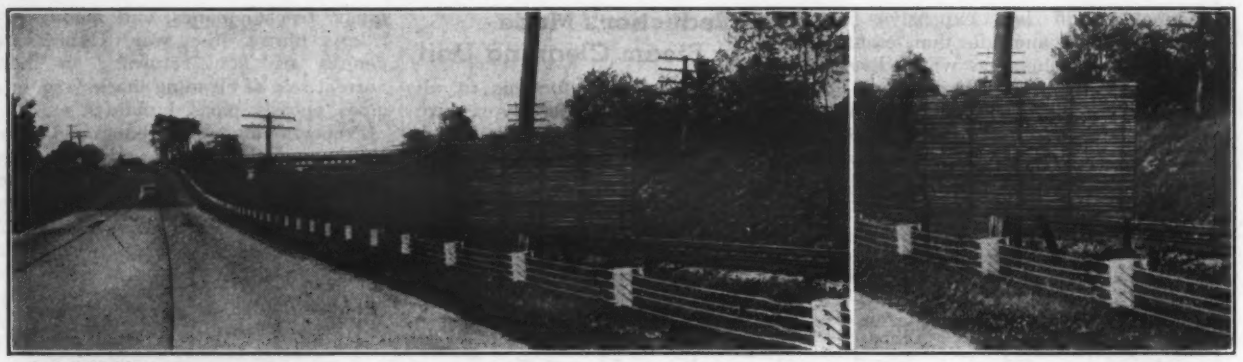
2 PLANS FOR MODERN JOINT DESIGN AND LAYOUT

These plans for modern highway design and construction, results of careful study of test and actual installations, carry out the thinking of forward looking highway engineers. Plan Number 1 shows Keystone Mastic Board Tongue and Groove Joint used as a longitudinal center strip as well as for transverse contraction joints—giving a maximum of load transmission between slabs. In Plan 2, Keystone Mastic Board Tongue and Groove Joint is used as center strip with Keystone Mastic Board Dummy Joint to create plane of weakness type contraction joints. FREE—Send for illustrated folder giving opinions of leading highway authorities as to the efficiency of Keystone's plans and designs for modern, concrete highway construction. It's full of valuable information on how Keystone can help you plan and produce better, longer-lasting concrete pavements. We'll also send complete blue-prints of the above plans and a catalog of Keystone "Road Tested" paving products.

KEYSTONE ASPHALT PRODUCTS CO.

43 E. OHIO STREET, CHICAGO 11, ILLINOIS • MANUFACTURING PLANT: CHICAGO HEIGHTS, ILLINOIS

A MOUTHFUL AT EVERY BITE
LET'S DIG IN...
and DO THE JOB
WITH OWEN BUCKETS
The OWEN BUCKET Co.
6030 Breakwater Ave., Cleveland, Ohio
BRANCHES: New York • Philadelphia • Chicago • Berkeley, Cal.



C. & E. M. Photos

To eliminate the hazard to motorists from glaring railroad locomotive headlights, District 1 of the New York State Division of Highways erected wooden screens along the highway right-of-way between the road and the railway tracks.

Screens Check Glare Of Locomotive Light

By constructing wooden screens along U. S. 9W, a mile south of Ravena, between the highway and the main line of the West Shore Railroad, the New York State Division of Highways has eliminated the cause of many accidents resulting from motorists becoming confused at night from the glare of the locomotive headlight on passing trains. This heavily traveled three-lane concrete highway, a main route between Albany and New York City on the west bank of the Hudson River, parallels the railroad for about a quarter of a mile at this point as the track makes a sweeping curve to come within about 30 feet of the road.

Southbound trains rounding this curve at night have thrown northbound motorists into confusion as the glare of the locomotive headlight was thrown across the road, with the train seemingly about to follow. Cars frequently ran off the road into the cable guard rails, and collisions between automobiles were also a result of the momentary blinding of the drivers from this piercing beam of light.

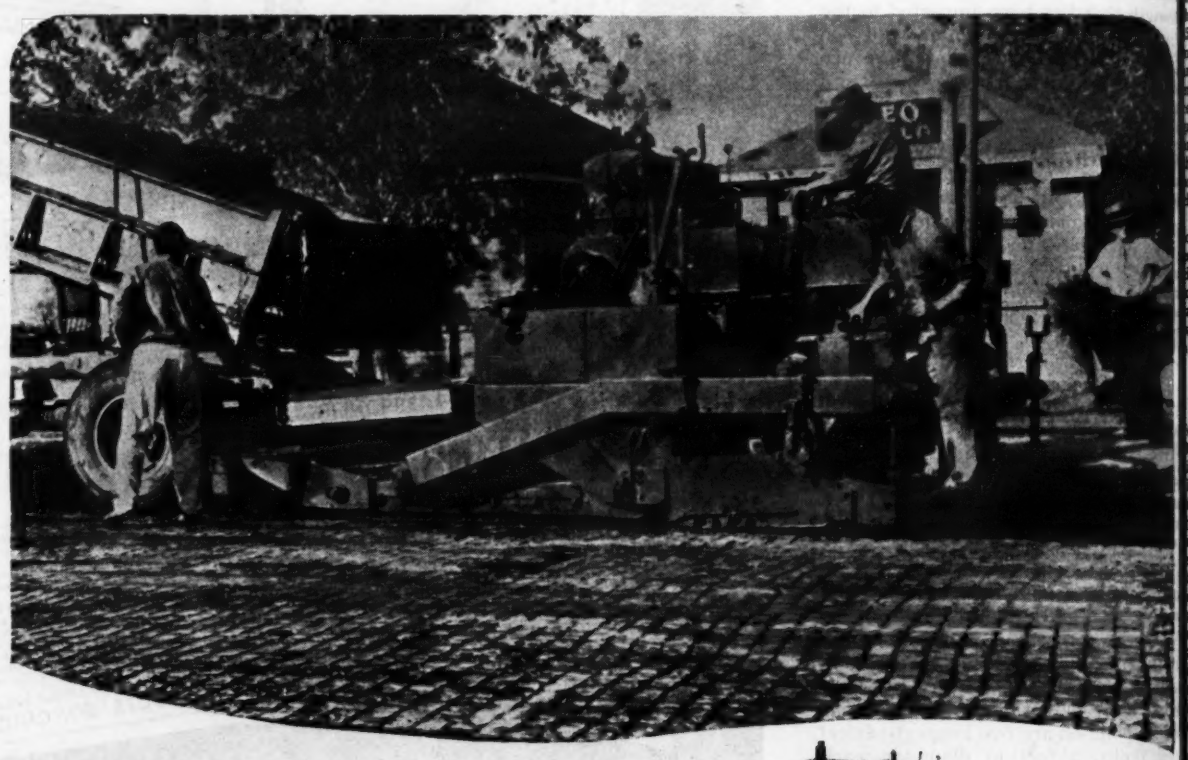
To overcome this hazard, maintenance engineers from District 1 of the Division of Highways, with headquarters at Albany, studied the situation at the railroad curve, and decided that a series of screens erected along the side of the 30-foot highway would shield motorists from the glare of the locomotive headlights. Accordingly five screens 50 feet apart were constructed on the highway right-of-way, just outside the guard rail on the east side of the road at that stretch where the track curves to parallel the highway.

The screens are 10 feet wide x 6 feet high and are constructed on a wooden framework of a sufficient height so that the bottom of the screen is 3 feet above the level of the road. They are set at an angle of 45 degrees with the road, which in this particular section is on a tangent. The screens themselves are made of split lengths of light wooden poles, about 1½-inch diameter, after the Belgian type of wooden rustic fence, only in these screens the poles are laid lengthwise and fastened to the frame.

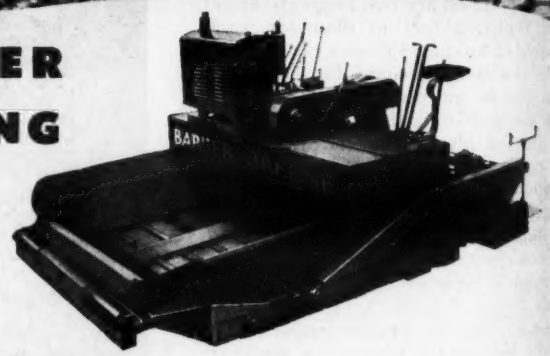
Now, as the trains come around the curve, the glare of the light is caught by each successive screen and no beam are thrown across the road to bewilder the motorist and lead him to think he is being run down by a locomotive. The work was done in District 1 of the New York State Division of Highways, of which P. J. Lamb is District Engineer and J. J. O'Hara is Supervising Engineer in charge of Construction and Maintenance Operations.

Hawaii Equipment Dealer Opens Office in California

Announcement has been made by the Edward R. Bacon Co. of Hawaii of the opening of an office at 130 Bush St., San Francisco 4, Calif., with Edward R. Bacon, Resident Partner, in charge. Mr. Bacon, well known West Coast distributor, has disposed of his interest in the Edward R. Bacon Co. of San Francisco, distributor of construction equipment in northern and central California and will devote all his time to the business of the Hawaiian construction equipment firm.



HOW A B-G FINISHER SOLVES RESURFACING PROBLEMS...



• When something must be done to rough, patched-up pavements, with their chuck holes and sinking spots, very often the best solution is complete blacktop resurfacing with a Barber-Greene *Tamping-Leveling* Finisher.

You can utilize the old base and save the cost of new construction . . . eliminate the need for special engineering and preparation —yet restore broken and traffic-worn roads and streets to smooth, safe surfaces that are as good as ever.

And whatever type of asphalt material you choose, your B-G Finisher will lay down a firm, level mat without the use of forms. Rolling can progress right up to the machine as it moves along steadily and speedily. Traffic interruption is practically avoided.

B-G finished surfaces *stay* level. An exclusive B-G mechanism tamps the material as it strikes it off, compacting the mix to uniform density. Two long, pivoted arms connect the crawler and screed units—abrupt changes in the thickness of mat are mechanically impossible.

Before you buy any bituminous finisher, learn about the many superior B-G features that years of engineering research have developed. Send for free catalog describing this versatile machine. Barber-Greene Company, Aurora, Illinois.

41-15

Barber B G Greene

Constant Flow Equipment

CUMMER

ASPHALT PLANTS

EIGHT SIZES

Up to 1000 Tons per day

DRYERS

Two-Fire and Internal Fire

30 to 100 Tons per hour

Electric Batch Timers

50 Years' Experience

THE F. D. CUMMER & SON CO.

EAST 17th & EUCLID

CLEVELAND 15, OHIO

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Determining Proper Charges Under Cost-Plus-Fee Contracts

A study of appellate court decisions suggests that many lawsuits and many more unstigated controversies would be avoided if st-plus construction contracts more comnly specified the items to be included or cluded in computing cost.

Take, for example, the case of Vinson & ringle v. Lanteen Medical Laboratories, 159 c. 2d, 612, decided by the Arizona Supreme urt. There, the plaintiff sued the defendant r a balance due under a cost-plus construcn contract, involving Guniting a reservoir. ing dissatisfied with the amount awarded the trial judge, the plaintiff contractor pealed to the Supreme Court, which inreased the award.

The contract provided that the contractor uld "furnish the necessary equipment, reman, nozzle men, and Gunite men to do k work on a force-account basis, cost plus per cent". An attached schedule listed the n and equipment to be used on the job d specified the per diem charges to be de. There was no further specification, exing that there would be extra charge for l, and grease used on the equipment for drivers and equipment operators; and cost and time for moving equipment to from the contractor's yards would be rged.

The Supreme Court decided that the folwing items, not having been specifically vided for in the contract, were not proper rges: cost of liability and compensation surance; social security and unemployment xes; and repairs on the equipment, use of hich, as previously noted, was paid for on rental basis.

California Decisions Quoted

The Supreme Court distinguished a Californis case (Citizens State Bank v. Gentry, Cal. App. 2d, 415, 67 Pac. 2d, 364) where e owner allowed similar charges although ey were not specified in the contract. In at case the contractor had submitted weekly statements as the work progressed, which cluded items for insurance and concerning quipment. The California court noted that e owner paid the "charges knowingly and ithout any fraudulent concealment on the rt of the contractor. It seems to us that hen these weekly statements were furnished to appellant"—the owner—"if there as any doubt about the charges for equipent and insurance premiums, appellant hould have demanded an explanation of the ame before she paid them."

The Arizona court's conclusion that, for want of specification in the contract, items overing overhead and repairs of equipment ere not chargeable is supported by a Calirnia appellate court declaration in the case f Advance Auto Body Works v. Asbury ransportation Co., 10 Cal. App. 2d, 619, 52 ac. 2d, 958: "Unless expressly written into e contract by defining exactly the overead intended to be covered, the words 'time nd material', and like expressions, will not nclude overhead charges, but refer solely to e wages and salaries of the men engaged in e particular work contracted for and the ctual cost of the materials furnished. The ords will not be extended beyond their ract meaning, and indeed they should be iven a restricted meaning. At least they hould be construed in the sense in which ey are popularly understood. One thus ontracting engages to furnish and keep in ondition the tools and necessary equipment o do the work."

Pennsylvania Supreme Court Quoted

The Arizona court found support for its onclusions in a decision rendered by the ennsylvania Supreme Court (Lytle, Campell & Co. v. Somers, Fitler & Todd Co., 276 a. 409, 120 Atl. 409, 27 A. L. R. 41), where it as declared: "The term 'overhead'—including the salaries of executive or administrative officials, interest charges for floating bonds, carrying charges, depreciation, taxes, and the general office expenses as here claimed—cannot be allowed as an operating charge in cost-plus contracts. To do so would open the doors to a flood of obligations not intended by the innocent words used in a contract such as the one before us. The term 'time and material basis' was intended to include the necessary cost of operation affecting the particular undertaking, the cost of labor and materials that went into and became a part of the finished product; each outlay thus expended must be included. To this there was to be added a profit of 10 per cent. This latter item was intended to take care of that proportionate share of overhead charges included in the company's 'overhead', or general expense."

Although the Arizona court gave controlling effect to the clause in the contract which allowed the contractor to charge for cost and time involved in moving equipment to and from their yards, regardless of where the equipment was when moved to the job, the court found that there was other evidence showing a mutual understanding that charge was to be made according to the contract clause.

Delay Charges Allowed

When the contractor's crew arrived at the reservoir, it was not ready for the Gunite job. Much water, snow, and mud had to be removed. The contractor notified the owner's representative that time would be charged under the contract during the crew's idleness. The representative then authorized the contractor to use the men in preparing the reservoir for Guniting. Under these circumstances, the Supreme Court decided that the contractor was entitled to charge on the agreed cost-plus basis for the time so consumed by the crew in doing the preparatory work, computing the men's wages on the bases specified in the contract for the entire job, covering their labor in the preparatory

(*Concluded on next page*)

Write for Details

A TOUGH ROLLER FOR TOUGH JOBS

Pierce-Bear 2-5 Tons Variable Weights

Engineered for economical operation where the going is tough. Compact, easy to operate. Narrow rear roller gives heavy-duty compression. Built-in water tanks for wet rolling. Powered with Allis-Chalmers Industrial Heavy-duty Model "B" gasoline engine.

Manufactured by

H. W. LEWIS EQUIPMENT COMPANY

431 Hodges Avenue
SAN ANTONIO 3, TEXAS
Phone, Garfield 6137

Avoid Legal Pitfalls

(*Continued from preceding page*)

work as well as the work called for by the Guniting contract.

Finally, the court declared: "Also, as to the equipment, this court finds that when equipment is taken out on a cost-plus job, if it should remain idle through no fault of the contractor, payment should be made."

Electric Co.'s Liability If Boom Touches Wires

Where an electric company knows that a boom on a piece of construction equipment is being operated in such proximity to its high-voltage wires as to endanger the construction employees, the company is bound to use reasonable care to guard against their injury. So ruled the New York Court of Appeals in the case of Bennett v. New York & Queens Electric Light & Power Co., 62 N. E. 2d, 219.

The boom of a crawler crane used in removing sheeting from a sewer trench in a New York street came so close to high-tension electric wires as to cause a short circuit, killing a workman on the job. The Court of Appeals upheld an award of damages in favor of his estate, against the electric company. The decision rests upon the ground that the company's representatives were present while the work was in progress and had assured the sewer contractor that the wires were so high, 34 feet above the street level, that no danger existed. The court said that it was for the jury to determine, under the evidence, whether the decedent met his death because of the electric company's failure to use the care that the circumstances required, knowing the conditions under which the decedent was working. The company knew what the contractor and his employee did not know, that the wires carried high voltage.

The Court of Appeals set aside a decision of the Appellate Division of the New York Supreme Court, which had ordered dismissal of the suit. (268 App. Div. 915, 51 N. Y. Supp. 2d, 278.)

Joint Compensation Liability Determined

The general contractor and a subcontractor on a construction job joined in renting a crane which was, at various times, used by each. The same crew operated the crane, the members being paid by the contractor or the subcontractor, depending on for whom the work was done. A member of the crew was injured while the crane was being used by the subcontractor.

Under these circumstances, it was decided by the California Supreme Court that both employers were liable to the injured man under the California Workmen's Compensation Act. (State Compensation Insurance Fund v. Industrial Accident Commission, 158 Pac. 2d, 195.) The conclusion that the general contractor was jointly liable was based largely upon evidence tending to show that he exercised over the injured man much the same control that a general employer usually exercises over workmen, although the particular work in which the injured man was engaged at the time of the accident was being done for the subcontractor, who paid for it.

Road Contractor's Duty To Mark Closed Detour

In constructing a highway in Arizona a contractor provided an oiled detour which paralleled the new road. When the new road was opened, nothing was erected at the entrance to the detour to indicate that it was closed. In the nighttime, the plaintiff drove along the detour for several miles and then collided with a pile of black-top material.

The trial court dismissed the plaintiff's damage suit against the contractor on the ground that the complaint did not state a right to sue, but the Arizona Supreme Court, on appeal, decided that the dismissal was improper, and that the case should be reinstated and tried. Said the higher court:

"Since the detour, under the law and the facts alleged, must be considered as having the status of a public highway, it was the duty of the defendant, as the party in possession and control of the highway, to give due notice that the detour had been closed to traffic. * * * *

"The rule seems to be well settled that when a public highway is abandoned, the travelers must be protected at the least to the extent of being notified in some adequate way of the fact that the old road has been abandoned. Barricades or notices warning the public of the danger of continuing to use the old way must be so placed as to put an unwary and unsuspecting traveler upon [illegible] guard. * * *

"The fact that the new road had been opened might or might not absolve the contractor from his duty of notifying the public that the old way had been abandoned. Under the allegations of his complaint, * * plaintiff would have the right to use either the detour or to travel down the main way. Both ways were open and both were apparently being used. He had the choice to take either road." (Breedon v. White, 158 Pa. 2d, 904.)

PAGE
BUCKETS
ARE USED ALL
OVER THE WORLD
From war-torn China, from liberated islands in the South Pacific, from the most remote corners of the world, come reports of how Page Automatic Buckets are successfully day after day doing the job for which they were designed.
The bucket illustrated is a 2½-cubic-yard Automatic
PAGE ENGINEERING COMPANY
CHICAGO 38, ILLINOIS

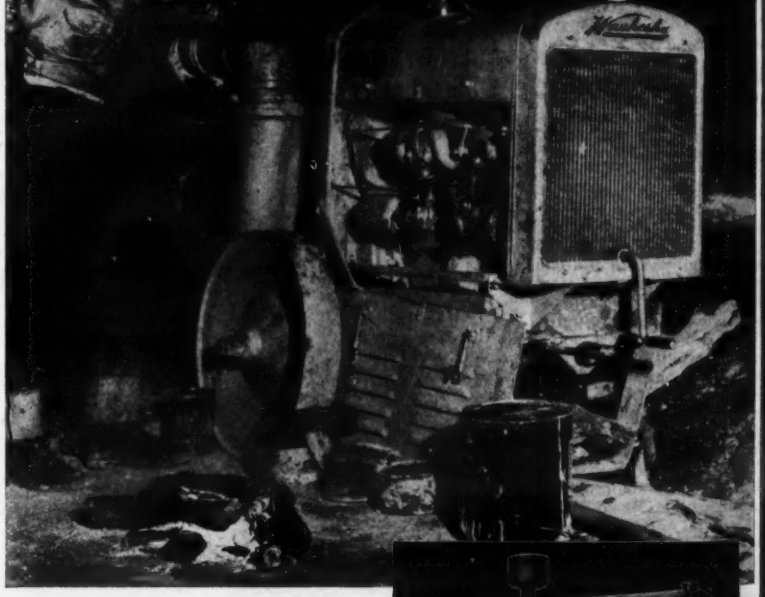
SPEED OPERATION for Snow Plows and Road Machinery with the • • • •

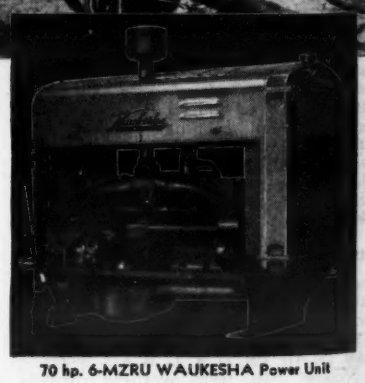
MONARCH Hy-Rocket Power Hydraulic Contr

Lifts plows ten times faster than hand pump.
Fan-belt driven by truck engine. Cab-controlled.
Easy installation on new or existing equipment.
Priced for the most conservative budget.

MONARCH ROAD MACHINERY COMPANY, 327-329 Front Ave., N. W., Grand Rapids 4, Michig

YOU CAN "PUSH" Waukesha-Powered Equipment





70 hp. 6-MZRU WAUKESHA Power Unit

● In peacetime . . . just as in wartime . . . time itself is a big factor. Whether it's a pump or a paver . . . truck or tractor . . . crane or compressor . . . if it's Waukesha powered you can *push* it.

Waukesha Engines *stand* up under round-the-clock, seven-day-week operation. And still turn out full-rated horsepower—with power in reserve, for the pinches. Because forty years of licking the tough jobs is built into every Waukesha Engine. Peacetime Waukesha Engine models . . . modern as tomorrow . . . are on the way. Gas, gasoline, or diesel fuel. With Waukesha wartime-proved ruggedness and dependability *plus*—the result of super power, smoothness, acceleration, and longer life with the greatest overall economy. Consult Waukesha Engineers about your power needs. Get Bulletin 1079.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN

NEW YORK • TULSA • LOS ANGELES

WAUKESHA ENGINES

The new LaPlant-Choate 2-yard scraper for use with wheel tractors is an adaptation of the unit used by the Airborne Engineers during the war.

New 2-Yard Scraper For Peacetime Use

An improved peacetime counterpart of the wartime airborne scraper which was used in large quantities by the Airborne Engineers for clearing roads and airstrips in inaccessible regions has now been released as one of the first postwar equipment units brought out by the LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa. This small 2-yard front-dump scraper, Model CW-2, is a sturdy yet light little scraper weighing only 2,250 pounds and is designed for economical use on many types of small earth-moving jobs heretofore not considered within the scope of scraper operations. These include cleaning ditches along highways, clearing slides, leveling dumps and small earth prominences, backfilling, roadside grading and landscaping, limited maintenance operations on county, town, and village roads, and general earth haulage.

The two rear wheels of the CW-2 can be located either inside or outside the cut, and the unit can make a full 90-degree turn or less within a circle diameter of 20 feet, it is reported. The hitch is designed for operation behind high-speed rubber-tired industrial tractors, such as the International Model I-4. When fully loaded, the weight is lifted from the tractor's front wheels, and much of the weight of the load is centered on the tractor's driving wheels for maximum traction. The bowl and apron are operated hydraulically by LaPlant-Choate's airborne pump, the same unit used to operate the famous tank-dozer. A three-position valve enables the cutting edge to be held in position and exert effective down pressure.

Other operating features include the ability to make cuts up to 11½ inches and to produce smooth finished work. It can be loaded in all types of scraper material without the aid of a pusher, the manufacturer states, or can be loaded from overhead as there are no overhead structures to interfere. Due to its low center of gravity, the scraper will not roll over on any slope that will hold the tractor. The bowl clearance and short wheelbase allow its use on soft fills or rough terrain. While its rubber tires are designed to provide high road speeds, it can be used on or off pavements for hauling.

Further details on this new LaPlant-Choate CW-2 scraper may be secured by interested contractors and state, county, and town highway engineers direct from the manufacturer.

Watch the Top Size Of Your Road Gravel

A timely warning has been issued by Prof. Ben H. Petty, Technical Extension Division of Purdue University, on the laxity being shown in some quarters regarding the top-size specification for gravel for road work. Professor Petty, on a few recent trips in the field, saw a number of cases where specifications as to the maximum screen size for road surfacing gravel had been ignored. Apparently, in some localities there has been a let-down, and unscreened pit-run gravel has been used. It was found that "passing 1½-inch screen" was resorted to when purchasing from commercial plants.

County and township engineers will regret the day they permitted such flagrant violation of specifications because the roads will be rough, maintenance will be more expensive, and wear on tires will be greater. Don't put any stone that will not pass a ¾-inch screen on a gravel road. Crush the oversize to pass this screen instead of wasting it if there are any appreciable quantities. The angular crushed particles will aid in keying the road surface, giving smoother roads, requiring less dragging, and making them more comfortable to ride over, with less wear on tires.

Ward LaFrance Officials

Appointments recently announced by the Ward LaFrance Truck Division of Great American Industries, Inc., of Elmira, N. Y., include Carlisle F. Smith as Executive Engineer; D. L. Gundry, Chief Engineer of the Motor Truck Division; and N. G. Bjorck, Acting Chief Engineer for the Fire Apparatus Division.

HOISTS • DERRICKS • WINCHES

A Complete Line of Builders' Derricks and Winches — nationally known for dependable service and long life.

Write for Catalog or send your problems to our Engineering Department

The Sasgen line is handled by leading equipment distributors everywhere.

SASGEN DERRICK COMPANY
3101-27 W. Grand Avenue, Chicago 22, Ill.

12 reasons why CLEVELAND SINKERS are PREFERRED...

1. Drop forged construction insures super-strength.
2. End-seating valve (used on most models) improves with use, prevents greater air consumption with long wear.
3. Big oil reservoir holds enough for four hour's steady operation.
4. Lubrication of rifle nut and bar prolongs their life 50%.
5. Complete lubrication of all parts of the machine insures longer wear of all moving parts.
6. Chrome plated spacer wears 3 times longer, insures full cushion on front end, avoids piston and side rod breakage.
7. Large areas of face contact hold parts in line, minimize wear at joints.
8. Floating chuck clutch prevents binding of piston.
9. Well designed exhaust port prevents freezing.
10. Throttle detents fully enclosed and well oiled.
11. Four pawl rotation—rugged and reliable.
12. Goose neck swivel air connection.

Many types, ranging from 32 to 78 lbs. in wet or dry construction, fully described in Bulletin 122. Ask for it!

MODEL H111
MODEL H10
MODEL H66

CLEVELAND ROCK DRILL DIVISION

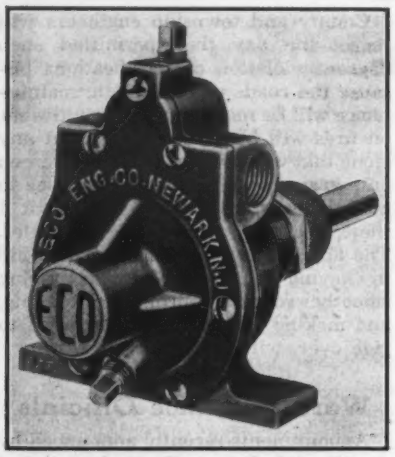
THE CLEVELAND PNEUMATIC TOOL COMPANY
CABLE ADDRESS: "ROCKDRILL" • CLEVELAND 5, OHIO
Leaders- in DRILLING EQUIPMENT

BRANCH OFFICES

Birmingham 1, Ala. — Lexington 19, Ky. — Salt Lake City 1, Utah
Butte, Mont. — Los Angeles 11, Calif. — San Francisco 3, Calif.
Denver 2, Colo. — Newton Highlands 61, Mass. — St. Louis 3, Mo.
El Paso, Texas — New York 6, N. Y. — Wallace, Idaho
Ironwood, Mich. — Philadelphia 30, Pa. — Washington 5, D. C.

CANADIAN DISTRIBUTORS

Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C.
Industrial Machinery Co., Ltd., 163 N. Water St., Halifax, Nova Scotia



The new Eco gearless pump has a number of features designed to provide long trouble-free service.

New Gearless Pump For Water, Light Oil

An improved gearless pump for water or light oil has been introduced by the Eco Engineering Co., Dept. 19, 12 New York Ave., Newark 1, N. J. Available with a single impeller and standard ½-inch connection or a double impeller with standard 1-inch connection, the new pump is featured, among other things, by the fact that it is equipped with special bearings which require only water lubrication, eliminating the need for grease cups.

The new Eco pump can be used for oil, or fresh or salt water. All metal parts are of bronze. The removable impeller is made of tough, resilient material composed of several layers of laminated sections, vulcanized under great pressure. It enables sandy, muddy, or gritty particles to pass without harming the pump. Obstructing material is quickly removed by opening the face plate. Easily installed, the pump can be mounted at any angle, and may be operated in either direction with equal efficiency, the firm says.

Further details on this new Eco pump may be secured direct from the manufacturer. Just mention this item.

Many Miles of Roads Are Still "In the Mud"

America's highways and byways are still far from being "out of the mud", Charles M. Upham, Engineer-Director of the American Road Builders' Association, told a conference of highway officials in Washington recently. "The public usually thinks of highways in terms of concrete four-lane limited-access freeways and forgets the many thousands of miles of streets and roads that are unsurfaced. We have a big job ahead making these 'underprivileged' roads passable the year round," Mr. Upham said.

Insisting that mud and dust are still important highway problems, especially in rural areas, Mr. Upham pointed out that while 83 per cent of the 563,520 miles of state-controlled highways are surfaced, only 73 per cent of the 304,000 miles of municipal streets and alleys and 49 per cent of the 1,928,000 miles of county and local roads have all-weather treatment. By surfacing is meant concrete, asphalt or tar coating, gravel, or stabilized earth. These figures are for 1940, the year before America entered the war and the last year of general construction. Since then, road building has been at a standstill except for access roads to munitions plants and military establishments, Mr. Upham emphasized.

Studies of the various types of surfaces by the Public Roads Administration show that the average life of soil roads is from 5 to 14 years; gravel or stone, 6 to 13 years; bituminous surface treatments, 11 to 21 years; bituminous mixes, 14 to 22 years; bituminous concrete, 13 to 20 years; portland-cement concrete, 17 to 24 years; and brick or block, 19 to 21 years. Naturally such factors as the kind and volume of traffic, action of the weather, types of materials used, design, quality of construction, and others enter into the deterioration and retirement of a highway.

This PRA report, cited by Mr. Upham, continues: "A road surface is retired when the wearing surface undergoes a resurfacing operation other than routine maintenance, the surface is reconstructed, the road is abandoned, the road is transferred to another authority for continued maintenance and operation, or the surface reverts to a lower type through lack of adequate maintenance. Studies show that approximately 12 per cent of all retirements involved construction on a new location.

"Obviously it is economic waste to build a road that will last for 30 years from a structural point of view only to have the road abandoned within 10 years because of poor grades, alignments, or other reasons. It is also short-sighted to build a surface expected to last 20 years under existing traffic conditions if traffic changes are expected that will result in the structural failure of the surface.

"These points must receive careful consideration by highway officials in preparing a post-war building program. With our roads in the worn condition that they are, and the proposed changes in motor vehicles promised soon, not only surfacing but the proper surface and design to use become vitally important," Mr. Upham concluded.

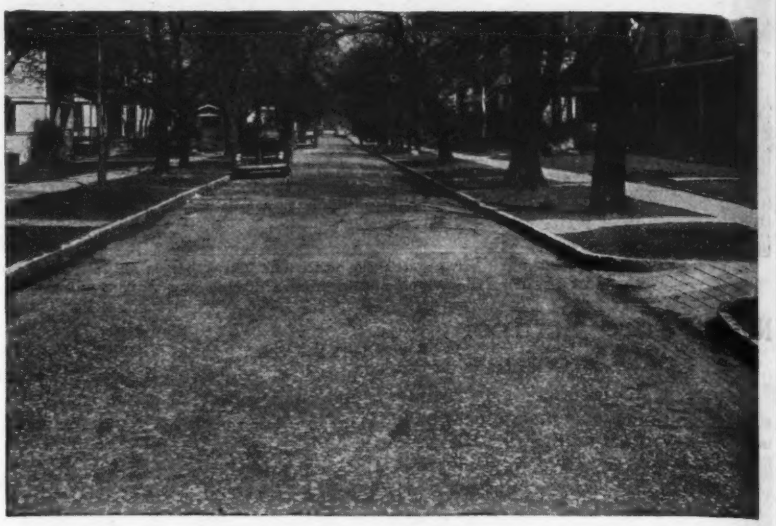
Price List and Catalog On Welding Accessories

A new 16-page booklet containing illustrations, descriptions, engineering data, and current prices of Airco gas welding and cutting supplies and accessories has recently been published by Air Reduction, 60 E. 42nd St., New York 17, N. Y. The types of equipment covered include welding rods, brazing and welding flux, hose, goggles and spectacles, gloves for gas welding and cutting, sparklighters, and tips. Also listed are carbon rods and plates, hard-facing rods, and other items.

Information concerning the properties and uses accompanies each article listed. Wherever possible, precise quantitative data are supplied, and numerous photographs and sketches supplement the text. Ordering is facilitated by the listing of sizes and stock numbers in easily read columns, with complete directions for ordering. The booklet also lists the addresses of Airco offices throughout the country from which these gas welding and cutting supplies can be secured promptly.

Road Rollers Are Now Made by Timco Mfg. Co.

The line of road rollers formerly known as products of the J. E. Ingram Equipment Co. are now being made and distributed by the Timco Mfg. Co., 1146 W. Laurel St., San Antonio 6, Texas, a division of Ingram. These products include sheepsfoot rollers, pneumatic-tired rollers, and a 3-wheel roller with cast hollow wheels in which water or sand ballast can be added to increase pressure. Four models of the latter roller are available, ranging from 4 to 12-ton capacity.



37 YEARS OF PROOF
that BITUVIA "can take it"

● Thirty-seven years ago the BITUVIA road tar pavement shown above was installed. It has served these many years without any major maintenance expense, and will continue to serve for many more years.

BITUVIA is available in all grades to meet standard specifications. The application of BITUVIA requires a minimum of equipment and man-hours per mile — making it the logical material for wartime maintenance and construction.

BITUVIA Road Tar

PLASTUVIA Crack and Joint Filler

PLASTUVIA is a resilient filler which bonds firmly with concrete, brick or stone, thoroughly sealing cracks and joints against water damage and disintegration. PLASTUVIA "stays put" and remains elastic under years of the heaviest traffic and extremes of heat and cold. It will not flow in summer, nor chip out in winter.

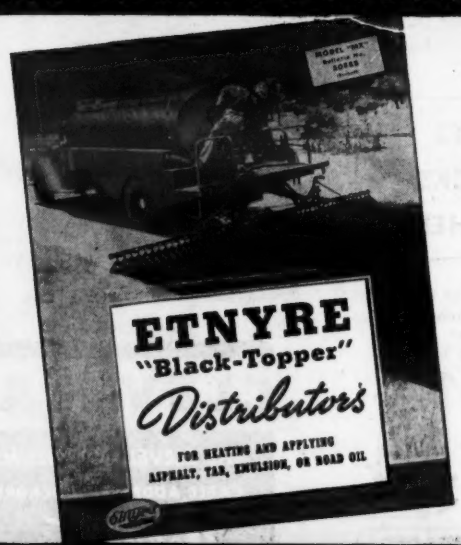
Pocket-size manual giving specifications and complete information for applying BITUVIA and PLASTUVIA will be sent on request.

REILLY TAR & CHEMICAL CORPORATION
Executive Offices: Merchants Bank Building, Indianapolis, Indiana
2513 S. DAMEN AVENUE, CHICAGO, ILLINOIS 500 FIFTH AVENUE, NEW YORK, N. Y. ST. LOUIS PARK, MINNEAPOLIS, MINN.
SEVENTEEN · PLANTS · TO · SERVE · YOU

TRANSITS and LEVELS
HEADQUARTERS for REPAIRS—any make
We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.
Write for new Catalog CE-111 of Engineering Instruments, Engineering Field Equipment and Drafting Room supplies.
WARREN-KNIGHT CO.
Mfrs. of Sterling Transits & Levels
136 N. 12th St. · Philadelphia, Pa.

MOVING? Be sure to give us 30 days' notice of your change of address—and let us have your old as well as your new address.
Unless you do this you may skip an issue or two before the correction is made—and you won't want to be missing any issues of CONTRACTORS & ENGINEERS MONTHLY these days!
CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Ave., New York 16, N.Y.

ETNYRE
"Black-Topper"
BITUMINOUS DISTRIBUTORS



SEND FOR FREE BULLETIN No. 508 BB
E. D. ETNYRE & CO., Oregon, Illinois

Consolidation Test For Rolled-Earth Dam

Pipe Installation Used To Show Consolidation as Work Progresses; Left in Place for Future Use

A VERY interesting test is being conducted at Anderson Ranch Dam in Idaho to ascertain the amount of consolidation within the rolled-earth embankment as construction proceeds and progressively greater loads are added. Installations for making the test will remain in place to ascertain the total consolidation during construction as well as that which may occur in future years.

Two telescoping pipe structures are being placed for the test, both near the center of the crest length of the dam, but with one midway between the cut-off walls at a point 250 feet upstream from the axis of the dam and the other 75 feet downstream. The structures consist of alternate pieces of 2-inch pipe 4 feet long and 1½-inch pipe 3 feet long, each piece of 1½-inch pipe telescoped 12 inches into the 2-inch pipe above and below it.

To the center of length of each 3-foot piece of 1½-inch pipe, a 3-foot length of 3-inch steel channel is attached by a ½-inch U-bolt to extend 18 inches horizontally on each side of the 1½-inch pipe. When set in the fill exactly 5 feet apart vertically by differential leveling, these cross-arms alternate at right angles, one parallel with, and the next perpendicular to, the horizontal axis of the dam.

The upstream testing column will be 365 feet high with 76 cross-arms and the downstream one 310 feet high with 64 cross-arms. Obviously the cross-arms, supported by the compacted fill on which they are placed, are free to settle with the fill as the 1½-inch pipe to which they are attached telescopes into the 2-inch pipe, and it is necessary only to measure the amount of this telescoping to learn how the embankment behaves under the superimposed load. To date, it has consolidated 6.53 feet.

Measuring the Consolidation

For making these measurements, a 1-inch-diameter brass "torpedo" 7 inches long is used. It slightly resembles a plumb-bob in appearance except for being rounded at both ends rather than pointed. From inside it, two spring-actuated wings fly out to engage the bottoms of the 1½-inch pipes which are telescoped inside the 2-inch pipes. In measuring the position of the bottom of each piece of 1½-inch pipe, and thus the true elevation of the cross-arm attached to it and supported by the embankment, the "torpedo" is dropped down the inside of the pipe on a 500-foot reel-mounted steel tape. As it goes down, it engages successively the bottom end of each piece of 1½-inch pipe, and the distance to it from a point of known elevation established at the top of the hole is read from the tape while a pull of 25 pounds is maintained on the tape by a spring balance. When the position of each piece of 1½-inch pipe has been measured and the "torpedo" reaches bottom, it is bumped lightly against the bottom of the hole which causes the protruding wings to retract into the body of the "torpedo" and lock in that position so that it can be withdrawn from the hole.

Installation of Device

The methods used for setting the measuring pipe plumb are interesting. For illustration, it will be assumed that a cross-arm is to be placed at an elevation of 4,000 feet, the one below it being in place at elevation 3,995. The 1½-inch pipe to which the cross-arm is attached projects 18 inches above it, capped by a 12-inch sleeve of 2-inch pipe with a ring on top. The installation is left undisturbed until the fill is in place and compacted to an elevation slightly above 4,005. The transit party then sets straddle stakes from outside monuments to mark the exact position of the pipe below. Between these straddle stakes a hole is excavated to elevation 4,000, large enough to permit placing the 3-foot-long cross-arm. A post-hole digger is then used to dig down to the top of the pipe cap previously placed at 3,996.5 and a drive pipe used to remove the dirt outside it for 12 inches more. The cap is removed and a 4-foot length of 2-inch pipe is placed over the projecting 1½-inch pipe. It is centered carefully under the lines crossing between the straddle stakes and set to the proper elevation above the cross-arm previously installed, after which dirt is firmly compacted around the exterior by small hand tampers.

The 3-foot length of 1½-inch pipe is then inserted in the 2-inch pipe, the joint being packed with tar-free oakum to exclude dirt. The cross-arm is set to correct elevation by instrument and seated to final grade in the compacted fill by tamping. The top of the 1½-inch pipe is then capped with the cap removed from below and the hole backfilled by hand. As the fill is placed, it is tamped by a Barco gasoline hammer to the same density as the surrounding embankment. During the tamping, the position of the top of the pipe is constantly checked from the intersection of the strings joining the straddle stakes to assure that it remains in proper vertical lines.

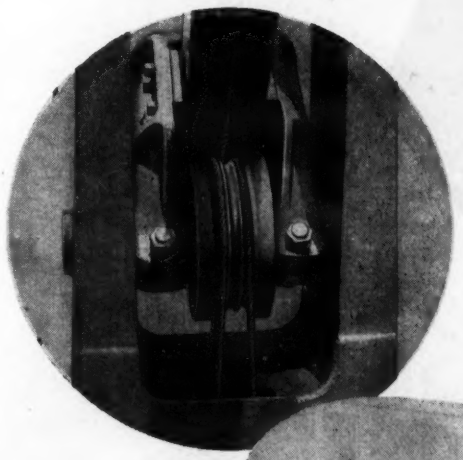
Personnel

Anderson Ranch Dam in Idaho (See C. & E. M., October, 1945, pg. 15) is being built for the Bureau of Reclamation by the Morrison-Shea-Twaits-Winston Co. V. A. Roberts is Project Manager, with William Woodall as Superintendent, Bill Denton as "Walking Boss", and R. H. Madsen, Engineer, for the contractor. For the Bureau of Reclamation, H. F. Bahmeier is Construction Engineer in charge of the project, with D. S. Walter as Principal Assistant. U. V. Engstrom is Field Engineer and Edwin Henry, Chief Earth-Work Inspector.

New Plant for Reliance

Expanding peacetime schedules have hurried the start of construction of a new building at the Ivanhoe Road plant of the Reliance Electric & Engineering Co., Cleveland, Ohio, manufacturer of electric motors, generators, and specialized industrial machine drives. To provide 44,000 square feet of space, the plant will cost $350,000 with equipment installed. Paugh & Brown, Inc., is the general contractor.

SECONDS SAVED
MEAN OUTPUT Gained

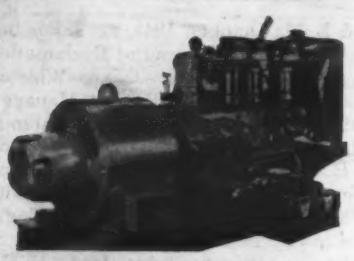


Balanced with hoist and swing to save vital seconds on every cycle, the Bucyrus-Erie rope crowd produces the kind of digging action that means more yardage. Whether the dipper is in close or extended to full reach and lift, whether it's empty or full, the operator has complete, positive control. Crowding and retracting are independent of all other functions, can be handled with regular rhythm for big output in shallow grading or in high speed loading — another factor in the outstanding performance record of ⅜-, ½-, and ¾-yard Bucyrus-Eries. And because the twin rope crowd eliminates many wearing parts, weight is kept down, maintenance reduced. Field conversion to crane-type front ends is easier, too, because the crowd drum is attached to the boom and comes off with it.

11E45

Positive independent twin-rope crowd does a lot to make Bucyrus-Eries tops in output. But there are plenty of other reasons, too. The full Bucyrus-Erie performance story will convince you.

So. Milwaukee BUCYRUS ERIE Wisconsin



One of the new Katolights coupled to a Cummins diesel engine.

Larger Generators Announced by Kato

The addition of several larger-size generators to its line of revolving-field-type units has been announced by the Kato Engineering Co., Mankato, Minn. Now available in sizes from 5 kw through 100 kw, these generators can be designed for special requirements.

The illustration shows a Katolight direct-coupled to a 95-hp Cummins diesel engine, one of its many applications. Rated at 50 kw at 80 per cent P.F., 62.5 kva at 1,200 rpm, this generator is designed to furnish 127/220 volts, ac, 60-cycle, 4 wire, but is available for standard voltages and frequencies.

Further information on this and other Katolight generators may be secured direct from the manufacturer.

Adjustable T-Square

A new all-plastic adjustable T-square has been added to the line of drawing instruments made by the C-Thru Ruler Co., 385 Capitol Ave., Hartford, Conn. Molded of heavy colorful plastic, this new device is streamlined, and incorporates a protractor in its head.

An adjustable arm is so fastened to the head that it can be pivoted to any angle. Another feature is the interchangeability of the arms which are available in lengths of 12, 18, 24, and 30 inches. Brass lugs permit ink ruling.

A bulletin illustrating and describing this new plastic T-square may be secured direct from the manufacturer by mentioning this publication.

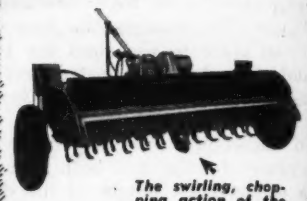
County Uses Bridges Of Creosoted Timber

Macon County, Ill., has made successful use of creosoted-pile-bent structures surmounted by I-beam stringers and concrete slabs for the bridges on its county highway system and, according to a recent report in the ARBA County Highway Officials Bulletin, expects to use this type extensively in its post-war bridge-replacement program.

Located in the prairie region of the state, and traversed by only one waterway of appreciable size, Macon County does not have a large bridge problem. There are, however, five bridges between 200 to 400 feet in length and approximately fifty bridges of 15 to 50-foot span on the county system. Twenty of these structures are over 25 years old and are planned for replacement.

All construction in Macon County is done by contract, with the County Highway Department responsible for the engineering and construction supervision.

HERE'S THAT EQUIPMENT YOU'LL NEED FOR SECONDARY ROADS—



The swirling, chopping action of the tines does the job.

ARIENS AGGMIXER

For mixed-in-place construction work, on secondary roads, Ariens Aggmixer is equipment designed and built especially for the job—for use wherever aggregates are used, such as all types of bitumens, cements, clay, chlorides, etc. These materials are mixed without being displaced on the road surface. Ariens Aggmixer thoroughly pulverizes, mixes, and aerates almost all types of aggregates with the binder used, doing the job thoroughly, rapidly and economically. It operates in connection with other general purpose road equipment, adjustable to any tractor with simple and positive hydraulic adjustment for depth. Made in 4 sizes with normal cutting widths 4', 5', 6', and 7'. Write for job fact sheets and name of nearest distributor.

ARIENS Company
BRILLION, WISCONSIN

You Can MAKE MORE MONEY ON JOBS LIKE THIS with MICHIGAN mobile SHOVELS—CRANES!

Here's Why: TRUCK MOBILITY cuts travel-time between jobs. No trailer or tow-truck required. QUICK CONVERTIBILITY means change-overs made in two hours or less—and one MICHIGAN handles *five* types of work—shovel, crane, clamshell, dragline, trench hoe. FINGERTIP AIR CONTROLS step up hourly output, get the job done faster, minimize operator fatigue! . . . But get *all* the facts about these profit-earning MICHIGANS—⅜ and ½ yard capacities. 6 to 12 ton cranes. Write for your copy of MICHIGAN Bulletin CE-115.

MODEL T-6-K
⅜ YD. SHOVEL
6 TON CRANE

MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

ENGINEERS WANTED

Mechanical
Electrical
Civil

Preferably those with

EXPERIENCE ADAPTABLE TO AIRCRAFT

Layout Draftsmen
Aerodynamicists
Stress Analysts

Or others with at least several years of engineering experience which will serve as a basis for aircraft work.

Permanent positions are available in the engineering of such planes as the Martin 202 transport, commercial version of the Martin MARS, and other new commercial and military commitments. Write including full information on education, experience and background,

to DIRECTOR OF ENGINEERING PERSONNEL,
THE GLENN L. MARTIN COMPANY
Baltimore 3, Maryland

Bureau of Reclamation Photo.

The post-war program of the Bureau of Reclamation to complete the initial features of the great Central Valley Project in California is under way, with earth being moved on the 160-mile-long Friant-Kern Canal which will carry water from Friant Dam southward through the San Joaquin Valley to Bakersfield. Peter Kiewit Sons' Co., San Francisco, the general contractor for the initial contract schedule, has a train of giant earth-movers and scrapers on the job.

AED President Sees Full-Employment Era

The opportunity for an "unsurpassed construction era ahead of us which should guarantee 'full employment' in the true sense of a day's work for a day's pay" is foreseen by Hamilton O. Penn, President of the Associated Equipment Distributors, now that the construction machinery industry is practically free from emergency restrictions. To achieve this goal, Mr. Penn adds, "We must revert to the American system of free enterprise and work by the contract method".

Addressing a group of construction and road-machinery distributors at Washington, Mr. Penn called attention to the revocation of Construction Machinery Orders L-192 and L-41-e and General Construction Order L-41. Only the OPA's Maximum Price Regulation 134, governing rental rates, and 136, fixing prices on retail sales, remain as governmental controls affecting the industry.

"There should be nothing to hold us back from developing a program in which construction of all kinds will play a predominant role, that will provide full employment for every able-bodied man in the country", Mr. Penn declared. "Our own industry [distribution of construction machinery] offers a gage for measuring the potentialities of the tremendous construction job that lies ahead. The nation was way behind on its road-building and highway-construction program before the war. We haven't even caught up with ourselves on highway construction and we won't for a long time, if ever.

"But, road building is only one phase of construction," Mr. Penn pointed out. "We need new roads and highways, not so much from the standpoint of providing jobs for the unemployed, but as a community and national necessity. By the same token, millions of miles of railway roadbeds must be repaired and, in many cases, re-laid entirely. Both the railways and public highways have taken a terrific beating because of heavy war duty. There is not a city or large municipality throughout the country that is not planning ambitious slum-clearance projects; there will be a greater demand for residential housing than ever before, small and large residential units, repairs of old homes in cities, as well as on farms.

"The American people are realistic enough to realize that we must have dollar for dollar value, that investors must be encouraged, and that we must take off our coats and go to work to liquidate our national debt. The American people also recognize that government controls are not needed in peacetime. The war is over. We must again consider the law of supply and demand, and act accordingly."

Hand Tool and Shop Accessories Catalog

The Armstrong line of shop accessories and hand tools is described in a 224-page catalog, C-39c, of the Armstrong Bros. Tool Co., 334 N. Francisco Ave., Chicago 12, Ill. The booklet illustrates, describes, and gives full specifications and prices on the firm's line of tool holders for lathes, planes, slotters, and shapers; turret-lathe and screw-machine tools; bits, blades, cutters, and high-speed steel; machine-shop specialties; lathe and milling-machine dogs; clamps; ratchet drills and drilling posts; many varieties of open-end and socket wrenches; and pipe tools. A complete alphabetical index is included in the catalog.

Copies may be secured by interested contractors and state and county equipment engineers direct from the company by referring to this item.

SNOW REMOVAL INSURANCE

Snow removal insurance means that you are equipped with ROSS SNOW PLOWS with "SNO FLO" moldboards. The plows that will go thru deep drifts and hard packed snow with less power. You know that they will come in from a finished job ready to go out on another.

Manufactured by

The BURCH CORPORATION

Crestline, Ohio

Equipment since 1875

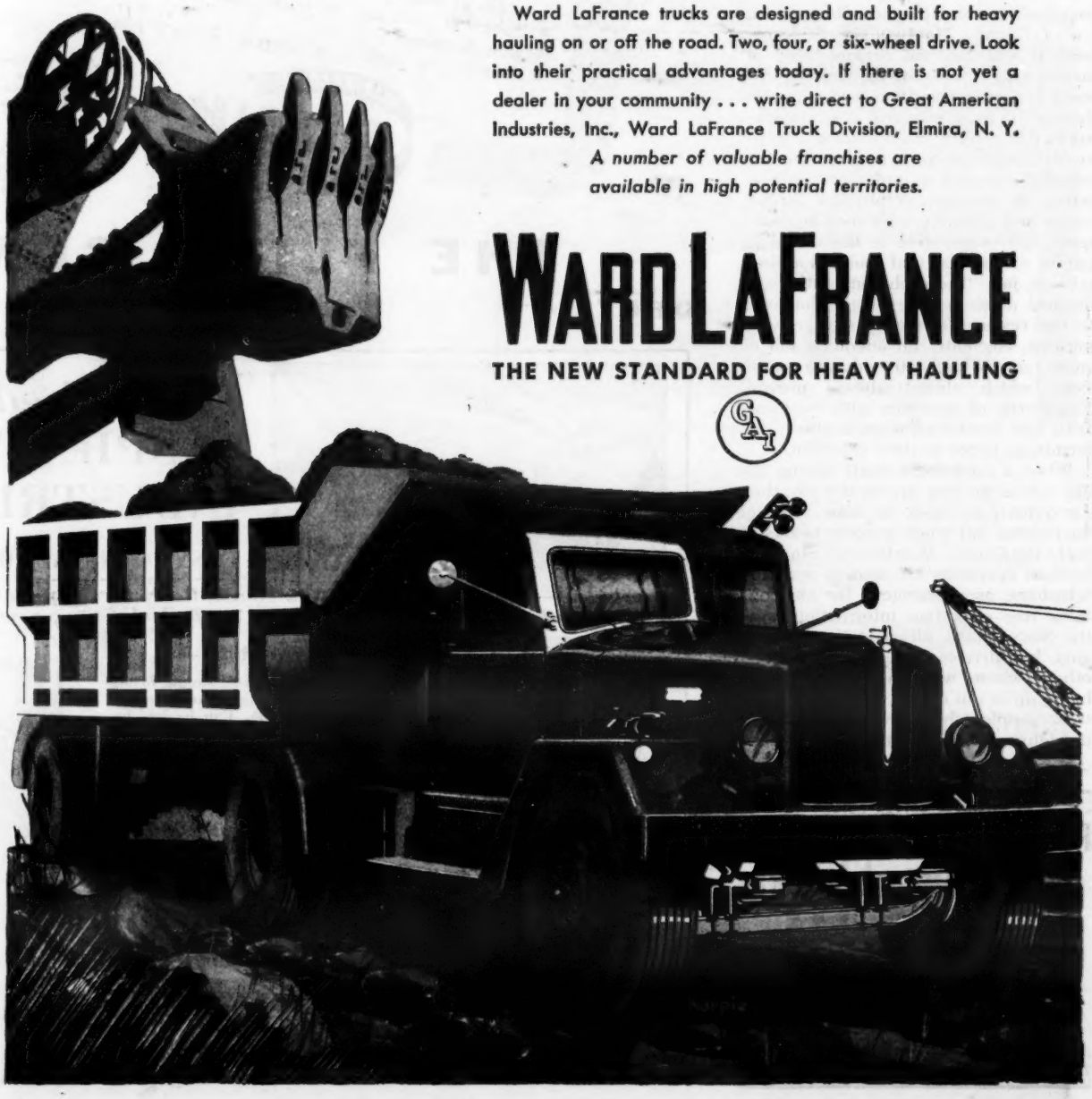
PAY LOADS THAT PAY OFF

When you find it practical to put one big truck to work in place of several small ones, you have taken a long step toward a permanent reduction in hauling costs . . . *provided* you can depend on it to take a beating and stay on the job.

Your first look at one of the new Ward LaFrance models will indicate what experience as an owner will prove . . . that here's a wholly new standard of truck building for *stamina*. No wonder . . . because it is based on practical experience building the famous Army heavy wreckers built to start their job where other vehicles failed.

Ward LaFrance trucks are designed and built for heavy hauling on or off the road. Two, four, or six-wheel drive. Look into their practical advantages today. If there is not yet a dealer in your community . . . write direct to Great American Industries, Inc., Ward LaFrance Truck Division, Elmira, N. Y.

A number of valuable franchises are available in high potential territories.



WARD LaFRANCE

THE NEW STANDARD FOR HEAVY HAULING

Highway Dept. Ready For Winter's Arrival

Last Year's Record Snow Cost West Va. $844,417 In Clearing 13,097 Miles Of State Highways

✦ WITH the grim reminder in last year's record snowfall of what might be expected from Jack Frost during a West Virginia winter, the Maintenance Department of the West Virginia Road Commission is prepared, if necessary, to swing into action again to achieve the same results as in 1944-1945 when 13,097 miles of state highways were cleared of snow at a cost of $844,417. Last winter's snowfall of 47.1 inches was probably the worst with which the Maintenance Department has had to cope since the Road Commission first started snow removal from highways during the winter of 1921-1922. The average fall of snow in previous winters was 33.2 inches.

West Virginia is predominantly mountainous, being crossed by several spurs of the Appalachian range, and where these are highest in the northern and eastern sections of the state the greatest trouble with snow is naturally expected. The general policy of the Maintenance Department is to remove snow as it falls from all primary routes and important secondary roads, especially those over which school buses operate or which carry a large amount of traffic. This snow removal is carried on continuously during a storm when such work is necessary.

Organization

In each of West Virginia's fifty-five counties the Maintenance Department has a County Maintenance Superintendent who has the responsibility of maintaining the snow-fighting equipment in perfect condition, and who also directs the snow-removal crews working in that county. Each piece of equipment is manned by two men who are selected from the maintenance organization on the basis of physical fitness, nerve, and initiative, who must be courteous and cooperative to the traveling public, and realize that theirs is an important job. These characteristics are deemed necessary, for it is a challenge to the resourcefulness of any crew to perform efficiently an adequate job of snow removal under the adverse conditions which almost always prevail. Familiarity of operators with road sections and local conditions is also a determining factor in their selection.

When a snowstorm starts during the day while the men are on the job, they can quickly get ready for snow-removal operations, but when a storm begins at night the County Maintenance Superintendent summons his men to work by telephone or messenger. He also obtains road-condition information from the State Police, filling-station attendants, bus drivers, hotel operators, and others whose work necessitates their being up or out during the night. From these people, who are vitally interested in highway transportation for one reason or another, he obtains information concerning the start of snowstorms and subsequent travel conditions.

During heavy storms the Superintendent and his assistants patrol the principal roads to keep in close contact with the situation and also to assist motorists who are in difficulty. He also informs the district office, of which there are ten in West Virginia, of snow-removal progress and road conditions three times a day, at 8:30 a.m., noon, and 4:00 p.m. This information is then immediately relayed by the district office to the Department of Information at Charleston, the state capital, for state-wide distribution.

Equipment

Equipment is stored either in the shop at the county headquarters or in smaller sub-county headquarters garages located in key spots throughout the counties. The number of pieces of equipment for snow removal in any one county depends on the size of the county, road mileage, and normal amount of snowfall, with an average of six units to a county. This equipment includes a number of combinations of snow plows with trucks, tractors, and motor graders.

If the fall is light, most of the snow is removed by straight blade plows attached to trucks, of which 327 were available last winter. Only one rotary plow is included in this equipment since West Virginia's snows are usually heavy and wet, and do not respond well to the blowing action of the rotary-type plow. For heavier snows the V-type plow is used on trucks, or on tractors of which 75 are used for this purpose; Angle-dozers are also used with the tractors in heavy drifts. Power graders, 175 in number, are employed in pushing the snow back off the shoulders, and also for scraping packed snow from the pavement. The equipment goes into action when the snowfall reaches a depth of 2 inches.

Each snow-plow unit is equipped with emergency supplies such as tow line, shovel, axe, lanterns, extra fan belt, light bulbs, fuses, extra tire chains, etc. At the beginning of the snow season a stock of replacement parts is made available for nominal repairs and replacements.

All snow-plowing units are equipped with blue flasher lights having front and rear lenses, mounted on the cabs, in order to warn the public of their presence on the highway. This light is used because it is distinctive, and the traveling public has learned what to expect when they see the flashing blue light. They are operated at night and during storms in the daytime when visibility is restricted, and are used only in snow work. For this reason they are secured to the left-hand side of the cabs with a wing-nut attachment to facilitate quick and easy changes.

(*Continued on next page*)

FAST NON-STOP SPREADER

Doesn't Limit Use of Truck to Spreading alone

- Enables you to get icy spots covered faster
- Speed to danger spots, start spreading without stopping truck
- Finish spreading—speed on to next spot without stopping truck
- Operated entirely by driver with clutch control in cab
- Spreads all granular materials up to 1", wet or dry
- Spreads forward or backward—full or half width of street
- Does not limit use of truck—won't interfere with dumping
- Attaches to truck as a tailgate, off in 5 min.

SELF-FEEDING FLINK

Flink Model WD31 Spreader with new safety protective housing over spreader blades and clutch.

USE FEWER MEN, TRUCKS, TIME

New simplified construction, installation and maintenance, new ease of operation . . . but basically the same practical, economical, efficient Flink spreader that has proved itself in a thousand tough road construction and maintenance jobs . . . in ice control and dust control all over America. Write for complete information.

THE FLINK COMPANY

DEPT. 4 STREATOR, ILL.

Servicised
ASPHALT PLANK *for*
INDUSTRIAL FLOORING

EASY TO INSTALL BY NAILING OR CEMENTING!

Servicised*—(ASPHALT PLANK)—*Is Tough, Resilient, and Lasts Longer—Therefore the Most Economical Industrial Flooring in Use for Traffic Laden Spaces, and Storage Areas.

— IMPERATIVE POINTS TO REMEMBER —

EASY TO LAY—ASPHALT PLANK is easy to install, simple to fit, nail or cement to any old or new type of flooring or sub-flooring such as wood, concrete, asphalt, stone, steel, or tile. Can be laid by non-professionals.

WATERPROOF—Non-absorbant, defies infiltration and decay.

LONG LIFE—Resists friction, Acid, Dampness, decay, wear; will not chip, split, crack, crumble, freeze, warp, buckle, shrink, or creep under heavy traffic.

REDUCES NOISE and vibration, it is resilient and absorbs shock, greatly diminishing noise under heavy traffic.

Send for SAMPLES & LITERATURE

Write in today for free samples and literature. You are also invited to consult with our Engineering Department on special problems concerning industrial floor covering.

TRUCK LOADING TERMINAL DOCK

A Few Typical Installations.
Swift & Company, Chicago, Illinois
National Battery Company, Chicago, Illinois
George A. Hormel & Company, Austin, Minnesota
Ambrosia Brewing Company, Chicago, Illinois
Brush-Beryllium Company, Cleveland, Ohio

SERVICISED

SERVICISED PRODUCTS CORP.

6051 WEST 65 STREET CHICAGO 38, ILL.

"BICKHELL BETTER BUILT"

PAVING BREAKER TOOLS

We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

Write for descriptive circular

BICKNELL MANUFACTURING CO.

12 LIME STREET ROCKLAND, MAINE

Highway Dept. Ready For Winter's Arrival

(Continued from preceding page)

Snow-Removal Operations

The most important factor in all snow-removal operations is speed, in order to lessen the opportunity for the snow to become packed and form an ice coat, resulting in expensive ice treatments later. Also if any appreciable amount of snow is left on the pavement and begins to melt, ruts are formed which concentrate the traffic in the ruts with resulting damage to the pavement surface, together with the traffic hazard which is created when a car attempts to get out of the ruts in passing. Furthermore, snow water has an extremely deteriorating effect upon bituminous surfaces; therefore the sooner the snow is cleared from the pavement surface, the quicker the pavement will dry off. Many of the base and pavement failures in the early spring can be attributed directly to delayed removal of snow from bituminous pavements.

On city streets and sections of roads where the traffic is very heavy, chemically treated abrasives or chemicals alone, such as calcium chloride in flake form or rock salt, are spread at the start of a snowstorm to prevent snow from packing and freezing, and also facilitating the scraping of snow from the pavement surface. When the packed snow softens into slush, usually the day following the chemical treatment, it is pushed off the pavement surface by power graders, as the depth of their cutting edge can be controlled more easily than the blade of a snow plow.

Snow plowing is almost always done from the right-hand side of the road in the direction of traffic, but in a few instances when plowing very heavy snow on steep grades, it is sometimes necessary to plow downhill on the wrong side of the road in order to have sufficient power to remove the snow. When this is done, flagmen precede the plow at a distance sufficient to give proper warning to approaching traffic.

Cleaning Shoulders

West Virginia clears snow not only from the pavement but also from the shoulders, to provide space for additional snow should a subsequent storm occur in the immediate future, and to put the snow in the side ditches where it belongs, or over the edge of the fill where it can do little damage. When snow is left on the shoulders, particularly on the high side of a superelevated curve, as it melts it runs down over the pavement, either damaging it, or freezing to present a dangerous condition. Snow which is left on the shoulders to melt causes erosion, and also softens the subgrade and removes proper support under the edge of the pavement.

This removal of snow from the shoulders is very often complicated by the fact that a deep snow frequently occurs when the ground is not frozen. In such instances the shoulders are soft, and when the snow-plowing equipment gets off the paved surface to push the snow back, the shoulders are badly rutted by the wheels of the equipment. To offset this difficulty, power graders are equipped with an extension so that the snow can be shoved back without having the grader wheels leave the pavement.

Other Clearing Techniques

Immediate attention is also given to railroad crossings to remove the bank of snow which the plows pull across the tracks, and to remove from the flangeways any packed snow, ice, cinders, or dirt that could result in the derailment of cars. In town and city streets, the snow is removed first from the gutters near catch basins and drop inlets in order to facilitate drainage. If conditions demand, snow is hauled away from the streets but as this is an expensive operation such hauling is kept to a minimum.

In plowing snow on bridges, windrows of snow left along the curb are removed as soon as possible to restore the effective roadway width and resumption of proper floor drainage so that the melting snow will not freeze and leave a hazardous slippery condition. As the presence of chlorides is injurious to steel members, care is taken in the disposal of snow containing these chemicals.

After the roadways and bridges are cleared, the maintenance crews then clean around and open all small drainage structures in order that the melted snow may be carried off as expeditiously as possible.

Snow Drifting

The drifting of snow, if not controlled, results in one of the most expensive snow-removal items as well as serious traffic disorders from blocked roads. To control drifting, West Virginia uses 131,490 linear feet of wooden snow fence 4 feet high, with pickets 1½ inches wide and a 2-inch spacing between pickets, and 3,320 linear feet of ever-

(Continued on next page)

Steam Hot Water or Heat . .

-- at Low Cost for every yard need

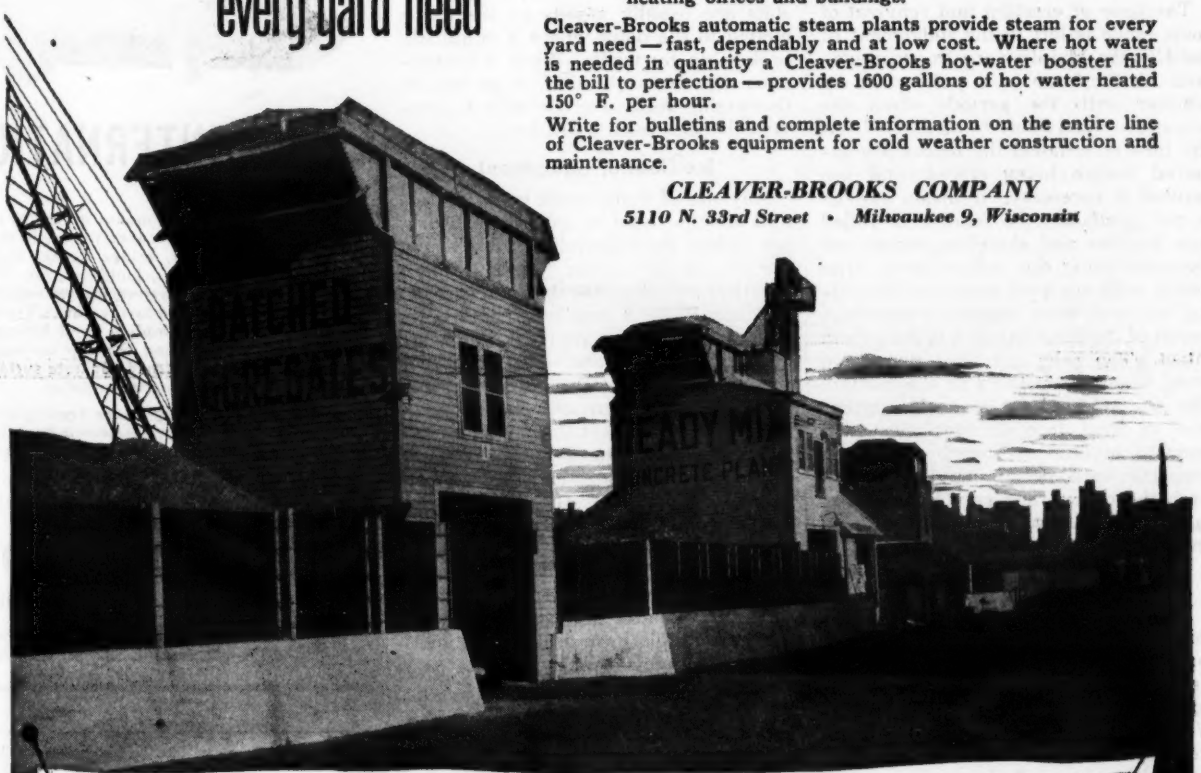
● Profitable, uninterrupted yard operation in cold weather calls for steam — hot water or heat — for many purposes.

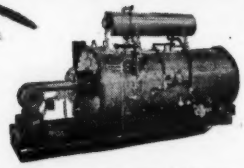
- thawing and heating aggregate in stock piles or bins — for winter concreting.
- heating water for central mixing plants.
- heating asphalt, oils, bituminous material in tank cars or storage tanks.
- steam or hot water for cleaning machinery — heating offices and buildings.

Cleaver-Brooks automatic steam plants provide steam for every yard need — fast, dependably and at low cost. Where hot water is needed in quantity a Cleaver-Brooks hot-water booster fills the bill to perfection — provides 1600 gallons of hot water heated 150° F. per hour.

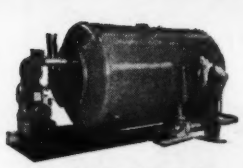
Write for bulletins and complete information on the entire line of Cleaver-Brooks equipment for cold weather construction and maintenance.

CLEAVER-BROOKS COMPANY
5110 N. 33rd Street • Milwaukee 9, Wisconsin





Automatic Steam Plants
Completely self contained; highly efficient; require only simple piping connections to place in operation. Fully automatic fuel-oil burner; condensate recovery and feed water pumping system; no stack needed, sizes from 20 to 500 h.p.; pressures 15 to 200 lbs.



Hot Water Boosters
Oil-fired; fully automatic or manual operation; no licensed engineer needed; two capacity sizes: 3000 gals. storage tank for 1600 gals. of water heated 150° F. per hour; 1500 gals. storage tank for 800 gals. of water heated 150° F. per hour.

Portable Pumping Boosters
Heats bituminous material by direct firing in one operation, loading directly to distributor, relay truck or returning to tank car. Two sizes, truck mounting or 4-wheel trailer.

Portable Tank-Car Heaters
Available in 2 and 3 tank-car sizes. Oil-fired with exclusive four-pass flue travel; dry-coil steam condensate return under pressure — no water or heat loss. Provides a portable source of steam wherever needed.

Cleaver-Brooks

Pioneers and Originators of *TANK CAR HEATERS *BITUMINOUS BOOSTERS *AUTOMATIC STEAM-PLANTS

THE RUD-O-MATIC TAGLINE

Spring Tension—Less Wear

Maintains positive tension at all times sufficient to steady a clam shell bucket under any conditions. Functions perfectly with boom at any angle.

Operates on a spring principle. There are no weights, tracks, pins or carriages to wear out or get out of order. Large bearing and fewer sheaves save wear on cable.

Tagline is complete with fairlead and cable attached. Can be installed in less than one-half hour.

Most Crane Manufacturers have adopted Rud-o-Matics as standard equipment

Highway Dept. Ready For Winter's Arrival

(*Continued from preceding page*)

green hedge planted at those locations along the highways where excessive drifting has occurred in the past. The picket-type fence is ordinarily placed parallel to and at a distance of 75 to 100 feet from the roadway; in areas where snow drifts badly, a second fence is sometimes placed about 50 feet back of the first.

In erecting the snow fence the pickets are fastened on the windward side of the posts, and the fence is wired to the posts in three places, top, center, and bottom, with the bottom of the pickets about 6 inches above the ground. The fence is erected with as much tension as possible, and care is taken that the poles are carefully braced. Fences are inspected after heavy storms to insure that they are intact.

The time of erection and removal of snow fence is left to the judgement of the County Maintenance Superintendents, as they are in a position to be familiar with the periods when the fences are most likely to be needed. At the time of removal the fences are repaired before being stored, and are painted if necessary. If inside storage is not available, the fencing is rolled into bundles and stored at convenient locations along the right-of-way. The picket ends are kept square while rolling, and a tie wire is passed around the center of the fence bundles to hold them intact. The rolls are then placed on wood sills to keep them off the ground. The site selected for storage is either free or kept free of vegetation. No fence is erected or stored on private property until permission is obtained from the owner, and care is exercised to see that no damage is done to crops and farm fences.

Ice Control

Icy packed snow, sleet, and frozen rain or surface water constitute the major winter highway hazards, and since ice can seldom be removed economically, it is the general practice in West Virginia to apply an anti-skid treatment to icy surfaces. An application of abrasives, which have been generously treated with chlorides, will bore through and loosen this icy crust, generally making it possible to blade the surface clean within a couple of hours.

A sleet storm or snowfall when the temperature is falling rapidly will undoubtedly produce hazardous ice conditions on city streets, and at dangerous spots on heavy-traffic roads. This is prevented by spreading about 700 pounds of flake or crystal chloride per mile in the center 10 feet of a 20-foot pavement during the storm. This prevents ice and packed snow from bonding to the pavement, and it may thus be readily bladed off. The use of this technique in cities, when substituted for the spreading of abrasives, eliminates the later cost of removing the abrasives from sewers and catch basins.

Another method of quickly dissipating ice is the application of chloride in solution. The brine is usually made up of 5 pounds of flake calcium chloride to a gallon of water. The resultant brine contains 4 pounds of chloride per gallon, which is the lowest-freezing-point solution. Bituminous distributors or ordinary sprinkling tanks are used to apply the chloride solution, and the results are usually speedy as the ice is melted to the point where it is quickly broken up by traffic. When a bituminous distributor is used, it should be thoroughly flushed afterwards to prevent damage from corrosion.

Ice-Control Equipment

Any size of dump truck from 1½ to 5 tons may be used in ice-control work, but unless the snowfall is very heavy the use of the lighter trucks is more practical and economical. When spreading abrasives, a specially built dispenser is fitted into the truck, replacing the original tail-gate. This dispenser consists of a new tail-gate designed to serve as a platform as well, and with side panels to funnel the abrasives towards the slide opening in the center of the tail-gate, which controls the flow to the spreader. The side panels wedge into the truck bed, and are further secured by means of metal rods fastened to the sides of the bed; these rod braces also serve as a safety railing for the workmen. Chains are used to support the working platform in the same manner as is employed with standard truck tail-gates.

In operation, two men are used on the back of each truck to regulate the flow of abrasive material into the spreader hopper, and to keep the material moving down the slope of the raised truck

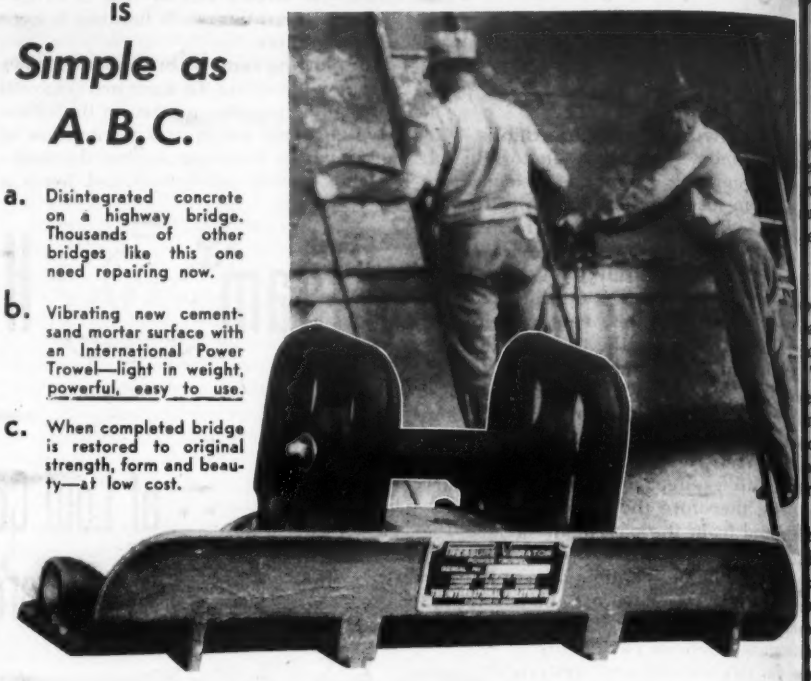
(*Continued on next page*)

RESTORATION OF DISINTEGRATED CONCRETE IS *Simple as A. B. C.*

a. Disintegrated concrete on a highway bridge. Thousands of other bridges like this one need repairing now.

b. Vibrating new cement-sand mortar surface with an International Power Trowel—light in weight, powerful, easy to use.

c. When completed bridge is restored to original strength, form and beauty—at low cost.



The INTERNATIONAL *Power Trowel*

This modern tool makes it easy to restore disintegrated concrete (with concrete) on bridges, bridge decks, abutments, roads, floors, buildings, etc. The combination of pressure and horizontal vibration—supplied by the Power Trowel—as well as a complete bond between the old structure and the new concrete, provides a new finished concrete surface of extreme density and hardness.

The International Power Trowel, built of light weight alloys, powered by an air turbine rotor built into the base, attaining 10,000 vibrations per minute. This hand-operated Power Trowel is of incredible lightness and power for its size. Every cement contractor equipment should include one or more of these Power Trowels which do so much to insure quick and lasting repairing jobs, at the minimum cost.

•

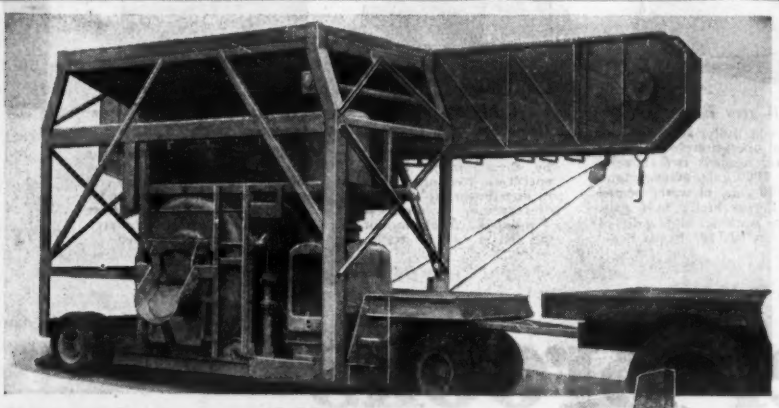
Write today for circular illustrating and describing this Power Trowel and also the complete line of International Vibrators—mailed free on request.

Submit Your Vibration Problems to Us.

The INTERNATIONAL VIBRATION Co.

16700 Waterloo Rd., CLEVELAND 10, OHIO

Also manufacturers of Standard Vibratory Units for General Concrete Construction —Foundries—Cement Block Molds—Material Handling and Industrial Applications.



ERIE *Strayer* PORTABLE CONCRETE PLANT combines in one portable unit—2 or 3 compartment storage bin—bucket elevator—AggreMeter unit to weigh batch in 15 seconds—water tank and proportionater—batching meter—pre-mixing cement feeder.

Write for booklet to 2511 Geist Road.

ERIE STEEL CONSTRUCTION CO.

ERIE, PENNSYLVANIA

AggreMeters • Buckets • Concrete Plants • Traveling Cranes

BACK THEM BUY BONDS

Mark well this button. It is worn by the men and women honorably discharged from the armed services. Though they are now in civilian clothes, let's not forget their service to our country and us. They will rate our every consideration.

ighway Dept. Ready For Winter's Arrival

(Continued from preceding page)

Each man stands in his own cor- id the tail-gate platform, and is tected against falling by the side nel in front, and by cross braces at e back and sides. The truck operates a speed of 10 to 14 mph, and the rate application is controlled by the slide ening in the dispenser. As a safety ture, 3-inch red reflector units are unted on each end of the platform. The spreader consists of a disk spin- r driven by the gear action of an tomobile differential with the gears cked to make them work as one unit, d is mounted on small pneumatic- ed wheels. A hopper of 8-gage metal constructed directly over the spinner. e spreader unit is fastened to the top ge of the tail-gate with chains, ad- sted so that, when the truck bed is wn, the spreader wheels are lifted off e road, and when the bed is hoisted e wheels are on the ground ready for reading to begin.

Last winter the Maintenance Depart- ent used 204 spreaders in treating th abrasives 3,317 miles of primary d 2,833 miles of secondary roads. The fferent types and amounts of abra- es and chemicals used were:

Cinders	52,930 cu. yds
Slag chips	3,233 cu. yds.
Stone chips	842 cu. yds.
Sawdust	323 cu. yds.
Sand	197 cu. yds.
Red dog	25 cu. yds.
Calcium chloride	1,519 tons
Sodium chloride, rock salt	665 tons

Abrasive-Storage Bins

At least one storage bin, with a ca- city of 100 to 150 cubic yards, is situ- ed at or within easy distance of the unty or sub-headquarters, in order at trucks can be quickly filled by avity with chemically treated abra- es. The bins are high enough for a uck with high side boards to be filled dily. In addition to the headquarters rage bins, other smaller bins with om 50 to 100-yard capacity are lo- ted at strategic points throughout the unty. A total of 67 bins were in use t winter.

The topography in most of the snow d ice sections of West Virginia is such at most of the bins are located on sites hich permit both the bins and the ucks to be loaded by gravity. By building the bins along a hillside, the trucks hauling the abrasives can dump directly into the bins from above, while the trucks used for spreading can pull beneath the bins and get loaded from above. In this manner the only handling necessary is the original loading of the abrasives, which is usually done by power shovels, cranes, front-end loaders, or conveyors.

West Virginia uses power graders to remove hard-packed snow from its highways. Here an Austin-Western 99 is at work on U. S. 50 near Grafton.

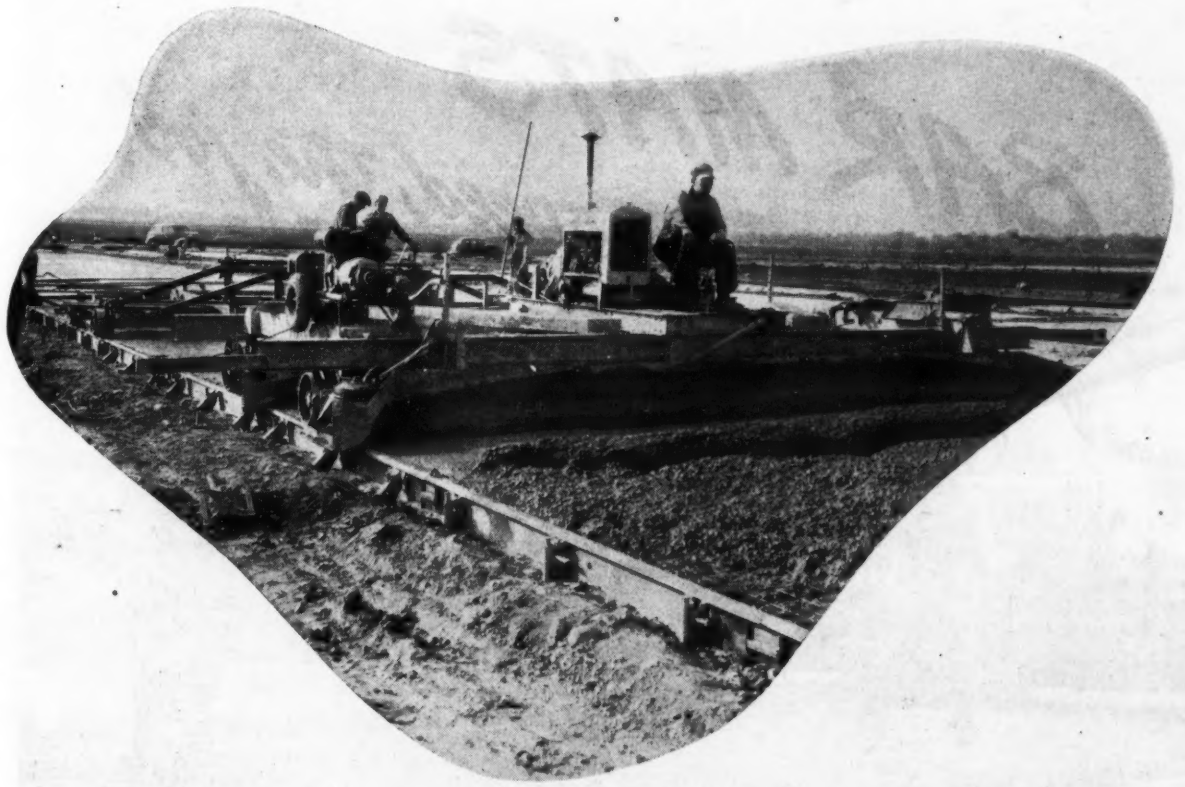
Chemically Treated Abrasives

The best results in ice control are obtained from abrasives that have been treated with chemicals. Generally speaking, 50 to 100 pounds of calcium chloride is required to treat successfully a cubic yard of abrasive. Treated abrasives are always more workable, and thus time and labor are saved in loading trucks and also in spreading.

The chemical is usually added to the abrasive as it is being stored by spreading the desired amount of the chloride over the full truckload, allowing the mixing to take place as the abrasive is dumped slowly into the storage bins. In some isolated places, and on dangerous curves, steep grades, intersections, or bridges, which are not within a reasonable distance of a storage bin, it is necessary to store chemically treated abrasives in stockpiles beside the road. These stockpiles are kept long and low so that chemicals may be added more easily. They are built up in 18-inch layers with an application of chemical

(Concluded on next page)

LA CROSSE
Heavy Duty Machinery Trailers
MADE IN CAPACITIES 3 TO 200 TONS FOR ANY PURPOSE
LA CROSSE TRAILER & EQUIPMENT CO.
LA CROSSE, WISCONSIN

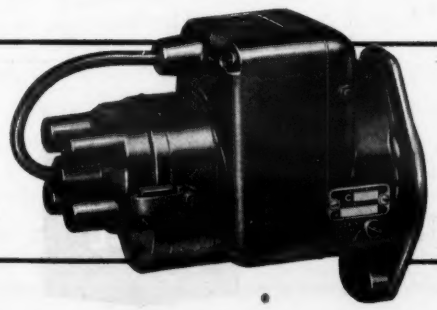


FAST RELIABLE PAVING EQUIPMENT . . . WITH A WICO MAGNETO

This Blaw-Knox 20-22 foot adjustable-width two-screed finisher is here paving Wright Field. Equipment like it is being used all over the world for road and airport paving. The best of such rigs that are powered by spark-ignited engines are equipped with WICO magnetos — as this one is.

The rough, wracking duty of a contractor's rig sorely tries a delicately adjusted, finely machined accessory like a magneto. Yet WICOs have been used on such equipment for a quarter of a century, and war experience under the worst possible working conditions in the South Pacific proved WICO's reliability.

When you buy equipment with a spark-ignited engine, make sure it includes a WICO magneto. Much of the finest contractors' equipment comes from the factory with WICOs. These fine magnetos are also available for replacement through more than a thousand authorized service stations throughout the continent. Wico Electric Company, West Springfield, Mass.



WICO
THE HEART OF YOUR ENGINE

Highway Dept. Ready For Winter's Arrival

(*Continued from preceding page*)

on top of each layer, until a total of not less than 50 pounds per cubic yard of abrasive has been supplied.

Ice-control operations are started as soon as any icy conditions are apparent, and are continued as long as necessary to safeguard public travel. It has been found that by using mechanical spreaders the same amount of abrasive will cover about three times the area possible by hand spreading. When traffic permits, the trucks with the attached spreaders travel down the center of the road, spreading a 10 or 12-foot lane of treated abrasives. The natural crown in the road plus the action of traffic works the abrasives over the entire surface, thus saving a considerable amount of material, because any abrasive deposited on the edge of the pavement is usually lost on the shoulder. Abrasive material is spread at the rate of about ½ to ¾ pound per square yard of surface.

Personnel

Snow removal and ice control are functions of the Maintenance Division of the State Road Commission of West Virginia, of which E. L. Worthington is State Maintenance Engineer and M. L. O'Neale is Chief Engineer. Ernest L. Bailey is Commissioner.

New Crane Gage

A gage to eliminate guesswork by the operator when handling heavy loads on any type of crane has been developed by the Clyde Iron Works, Inc., Duluth 1, Minn., and is described in a special bulletin which is available to readers of this magazine on request.

Installation of this Clyde crane gage is comparatively simple and can easily be done in the field. The weighing unit, a sturdy piece of mechanism which weighs the load, is incorporated with the upper load block on the boom. By means of electrical contact, the weight of the load is recorded on a large, easy-to-read dial mounted in the cab within the operator's vision. The contactors are made of silver to avoid corrosion and assure good contacts at all times. Current is furnished by a battery on gasoline and diesel-powered cranes, and through the use of a small 6-volt transformer on electric machines.

Whenever the crane's load becomes dangerous, a red warning is flashed on the dial; a green light shows while the load is within the machine's rated capacity. Thus the operator need not know the weight of the load or the radius of the boom in order to work in safety, as this gage informs him immediately of overloading.

As Clyde crane gages are engineered for each individual crane, detailed information on the make, various dimensions, and capacities of the machine is necessary. A special data sheet, Form 44-A, is included in the bulletin for determining these data in conjunction with a large diagram in the booklet.

As the big pavers and the squat finishing machines move along, the work goes smoothly and quickly if you're using Bethlehem Bar Mats. For they're rigid, easy to handle, and lie flat once they're in place.

In the stockpile and alongside the road, they'll stand a lot of rough treatment. No time wasted straightening out your bar mats—because these Bethlehem mats, made of new-billet steel bars clipped together, really *can* take it!

Bethlehem can supply not only bar mats but all the other steel products used in concrete highways and highway bridges. Buy the Bethlehem way, and you get coordinated service that will save you confusion, delay and extra paper work. Your order is handled as a unit, with shipments scheduled to reach the job as needed.

Write or phone the nearest Bethlehem district office today for full information about Bethlehem road steel service.

BETHLEHEM HINGED BAR MATS

For convenient handling and stockpiling in wide widths, Bethlehem has developed a new hinged reinforcing-bar mat which folds over double. Made like the regular bar mat, of deformed bars clipped together, it is easier to truck, and can be handled by two men. It is less likely to be damaged in handling, is readily installed, and lies flat.

BETHLEHEM PRODUCTS FOR HIGHWAYS

Road Joints • Center Strip • Dowels • Dowel Bar Supports • Reinforcing Bars Bar Mats • Bar Ties • Reinforcing for Concrete Pipe • Bridge Floor Reinforcing Concrete Slab Spacers • Welded Wire Fabric • Guard Rails • Guard Posts and Brackets • Wire Rope and Strand • Right-of-Way Fence and Posts • Anchor Rods • Pipe • Hollow Drill Steel • Digging Bars • Structural Steel • Mold Boards • Corrugated Sheets • Turnbuckles • Tie Rods, Spikes, Bolts and Nuts Timber Bridge Hardware • Sheet and H-Bearing Piling

BETHLEHEM STEEL

No Air Compressor and Hose
No Battery Box and Cable
No Springs

EASIER—
FASTER—
CHEAPER
with
SYNTRON
100% Self-Contained
Gasoline Hammer
PAVING BREAKERS

Busting Concrete
Drilling Rock
Cutting Asphalt
Digging Shale and Clay—and other jobs.

Write for illustrated folder No. B-43

SYNTRON CO.
227 Lexington Homer City, Pa.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York 16

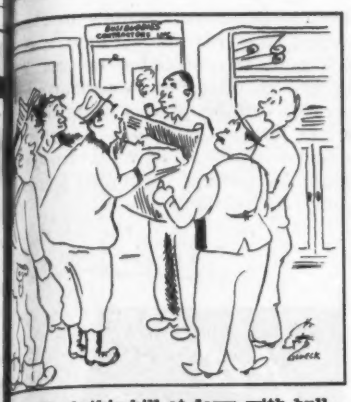
Enclosed is my remittance of $ for the next twelve issues of CONTRACTORS AND ENGINEERS MONTHLY.

Name_____

Position_____
(Or Type of Business)

Address_____

(City)_____
N. B., Cash, check or postage stamps will be entirely acceptable.



"We attack this hill at dawn with bull-dozers, dynamite, and 1¾-yard excava-tors—our objective must be reached by 0800 hours Tuesday."

ew Silicone Greases Offered by Dow Corning

A line of greases containing the new at-stable organo-silicon oxide poly-rs known as silicones has been an-unced by the Dow Corning Corp., a m formed in February, 1943, by the rning Glass Works and the Dow emical Co. Used for a wide variety products, silicones are said to extend range of service temperatures be-nd the limit of thermal stability of nventional organic products, and are erefore adaptable to greases which st withstand low and high tempera-res.

The DC bearing greases for general brication are designed to be water-sistant, heat-stable, practically non-latile up to 200 degrees C (400 de-ees F), and highly resistant to hard-ing over their recommended tem-rature range. There are two types of icone greases for special high and w-temperature lubrication. DC 31 d DC 41 are black greases thickened ith a finely divided inorganic material, d contain no graphite. DC 33 and C 44 are thickened with metallic soaps d are light tan in color. All four have lubrication life at temperatures up to 0 degrees C which is comparable to t of the best petroleum greases erating at temperatures in the neigh-rhood of 100 degrees C, the producer tes.

DC 31 and DC 33 are designed pri-arily for low-temperature lubrication t can also be used at high tempera-res. DC 31 has low electrical resist-ce and is serviceable in bearings erating at speeds up to 3,600 rpm and temperatures as low as minus 60 de-ees C. DC 33 has higher electrical sistance and is designed for bearings erating at speeds up to 10,000 rpm d at temperatures as low as minus 75 grees C.

DC 41 and DC 44 are for high-tem-rature lubrication. The former is rviceable in bearings operating at 00 rpm and gradually thickens at mperatures above 200 degrees C. DC is serviceable in bearings operating speeds up to 10,000 rpm and tempera-res up to 150 to 160 degrees C. It parates at temperatures above 200 grees C.

A catalog on new engineering ma-rials containing silicones, and includ-g further information on the DC line silicone greases, may be secured by ose interested direct from the Dow rning Corp., P. O. Box 592, Midland, ich., by mentioning this news item.

Richkraft Western Office

A West Coast office, with C. A. Cook Manager, has been established in the cific Bldg., Oakland, Calif., by the chkraft Co. of Chicago, manufacturer building papers, traffic paints, and mpounds and spray machines for con-ete curing.

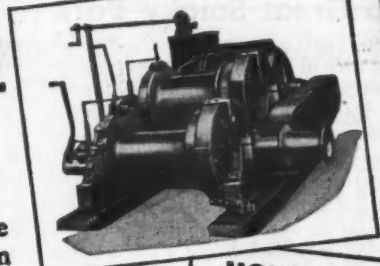
District Engineer for the H. H. bertson office in San Francisco since 3, Mr. Cook was with the Sisalkraft . from 1933 to 1943. Among his ac-tivities will be the direction of sales for the recently developed Richkraft business of striping airport runways, streets, and roads with Prismo reflective paint.

Distribution of Richkraft products in Mr. Cook's territory is to be handled in northern California through Pacific Coast Aggregates, Inc., whose main offices are in San Francisco, with branches in Oakland, Fresno, Stockton, Sacramento, Berkeley, Emeryville, San Jose, and Daly City; and in the Northwest Territory by the Nelson Equipment Co., Portland, Oreg., with branches at Seattle, Spokane, and Twin Falls, Idaho. Other outlets are planned.

Tire Conservation

During the war, tire conservation was a patriotic duty. Now tire conservation is an opportunity for saving. It is the simplest easiest way possible to save money on tires. Many operators have made savings in excess of 15 to 20 per cent through the application of scientific preventive-maintenance methods.

Hoists to Fit the Job

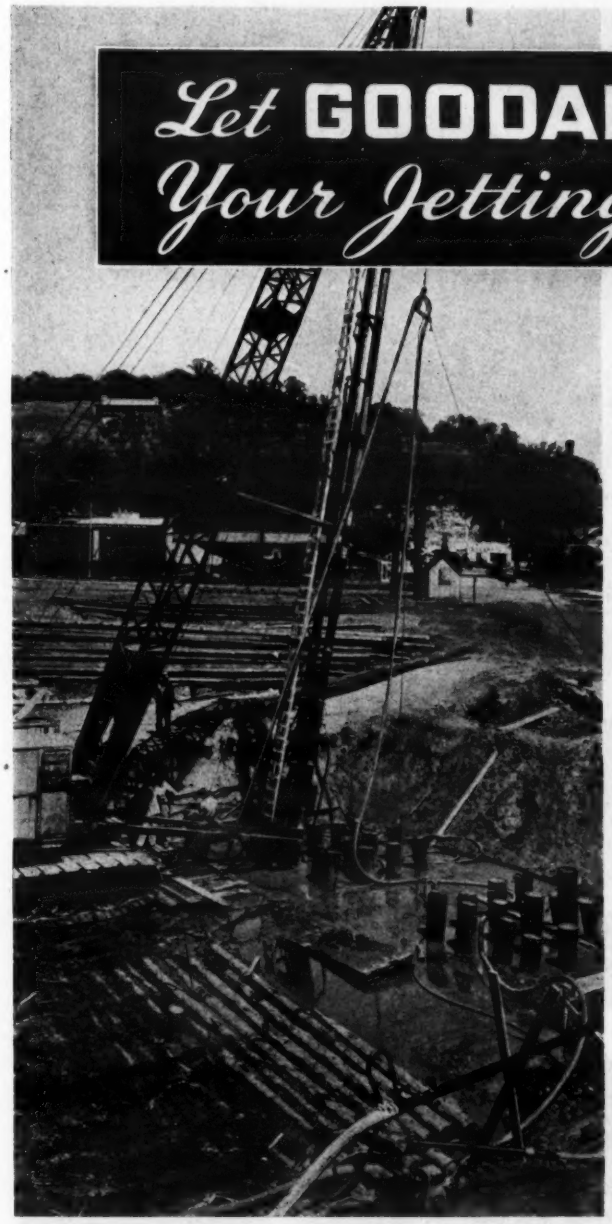


Lidgerwood hoists have earned a 70-year reputation for dependability and efficiency *on the job*. There's a Lidgerwood gasoline, steam, electric or Diesel hoist to fit every construction need. When you need a hoist inquire *first* of LIDGERWOOD.

HOISTS FOR:
CABLEWAYS
INDUSTRIAL PLANTS
CONTRACTORS
MINES—DOCKS
RAILWAYS

LIDGERWOOD
ESTABLISHED 1873
Manufacturing Company
MAIN OFFICE AND WORKS ELIZABETH, NEW JERSEY

Let GOODALL *Quality Keep Your Jetting Costs* DOWN!



"ALLGOOD CORD" JET HOSE

STYLE D-119

Made to stay "on the job *longer*" regardless of rough handling, high pressures and the strain of suspended weight. Construction combines a smooth, tough rubber lining; plies of exceptionally strong, hard-woven duck bound together by an efficient rubber friction; and a husky, long-wearing cover.

Used for machine jetting at maximum pressures of 250 lbs., and available in all sizes from 1½" to 4" inclusive.

Contact our nearest branch or main office for details of GOODALL hose, belting, boots and clothing for every construction and roadbuilding service. Remember . . . the GOODALL name and trademark mean "On the Job LONGER!"

Increasing availability of certain raw materials for the making of industrial hose and belting will bring a quick return to the pre-war quality constructions for which GOODALL has been famous for 75 years. From now on, original trade names for GOODALL products, discontinued during the war because of the necessary use of "duration" constructions, will again have their full significance from the standpoint of reliability and long service life.

GOODALL

THE GOODALL-WHITEHEAD COMPANIES

Philadelphia • Trenton • New York • Chicago
Pittsburgh • Boston • Los Angeles
San Francisco • Seattle • Salt Lake City • Houston

Factory—Trenton, N. J.

We are participants in the ownership and operation of National Synthetic Rubber Corporation

Established 1870

Tenn. Access Roads To Great Smoky Park

A five-year program calling for the expenditure of nearly $9,000,000 to provide access roads in Tennessee to the Great Smoky National Park has been worked out by the Tennessee Department of Highways, the Public Roads Administration, and the National Park Service. Expenditures contemplated during the program include $3,065,000 by the State, $2,300,000 of Federal-Aid funds, and $3,500,000 from National Park road funds.

Included in the plans is a four-lane highway from Knoxville to Gatlinburg, consisting of a loop drive from Knoxville to Kinzel Springs, along the proposed foothills parkway from Kinzel Springs to Pigeon Forge, and returning past Sevierville to Knoxville. There will also be a new parkway extending from this loop near Pigeon Forge to the park entrance near Gatlinburg.

The foothills parkway section will be constructed with funds made available to the National Park Service under the Federal Highway Act of 1944. Under the terms of this Act, the State is required to furnish the right-of-way for this parkway, but all other costs will be borne by the Government. The remainder of the loop will use present U. S. routes, improved to adequate standards through the use of state and Federal-Aid funds.

The five-year program proposes first the construction of a new single roadway between the vicinity of Sevierville and Pigeon Forge and also between Maryville and the parkway near Kinzel Springs or Townsend. Following this will come the development of the Knoxville-Sevierville and Knoxville-Maryville roads as divided highways. About 1½ miles of the latter route has already been built as a dual roadway. This construction and reconstruction is to be carried out under Tennessee's Federal-Aid program.

This plan for improved access to the Great Smoky National Park, together with North Carolina's program for the improvement of approach highways to the park on its side, should ultimately provide attractive modern routes which will bring an even greater number of visitors to this national park as well as to both states.

Adams, Airport Engineer, Joins McLaughlin-Carr

The appointment of James W. Adams as Chief Engineer in charge of airport development work has been announced by McLaughlin-Carr Associates, New York City firm engaged in architectural, industrial, and aeronautical design, engineering, and research.

Sixteen years with the Curtiss-Wright Corp. as engineer in charge of airport engineering, design, construction, and maintenance, Mr. Adams designed and engineered the old North Beach Airport in New York. Just before this country's entry into the war, he designed and built two major airports in West Africa for Pan American Airways. On these "rush" jobs, he was forced to resort to primitive methods to clear almost impenetrable jungle, and recruited 4,000 natives for the task. Within four months, Pan American's tra oceanic equipment was using the fiel while for the next eight months co struction of modern runways a drainage systems continued under M Adams' direction.

Slugger
A sledge hammer wallop...muscles of steel that never tire—that's the Barco Portable Gasoline Hammer. Put this tough slugger on any job of breaking, drilling, driving, tamping and watch Barco knock it out in record time. Air cooled, two cycle, single cylinder, the Barco operates efficiently in any season and at any altitude. Gas tank holds two quarts, enough for at least two hours continuous operation.
Try One
BARCO Portable Gasoline Hammers
FREE ENTERPRISE—THE CORNER-STONE OF AMERICAN PROSPERITY
BARCO MANUFACTURING COMPANY, NOT INC., 1818 Winnemac Ave., Chicago 40, Ill. • In Canada: The Holden Co., Ltd., Montreal, Can.

Johnson Engineers are ready to assist you in designing and building a ready-mix plant that fits the actual needs of your market—one that will produce the bigger profits *at a minimum investment.* Johnson equipment can be expanded economically as your sales grow.

Specific recommendations, and an individual plant layout—featuring Johnson's famous Concentric batcher that delivers scientifically batched material *economically*—as you need it, are yours for the asking.

This service, of course, is without obligation.

As the first step—write today for details.

THE C. S. JOHNSON COMPANY
Champaign, Illinois
A Koehring Subsidiary

Sales Manager—Road Machinery
WANTED

Opportunity with responsible company manufacturing road graders and other road machinery. Write full details as to age, experience and past salary. Replies held confidential.

Address Box 258
CONTRACTORS & ENGINEERS MONTHLY
470 Fourth Avenue, New York 16, N. Y.

C. & E. M. Photo
An Alabama road crew using a Sullivan wagon drill and Gardner-Denver jackhammers opened a 250-foot rock cut.

Deep Rock Cut Opens New Road

Jackhammers and Wagon Drill Used in Road Cut; 75,000 Yards of Rock Removed on 1.2-Mile Job

HEAVY rock cuts on a 1.2-mile stretch presented a formidable obstacle to the completion of the reconstruction of State Route 68 in northeastern Alabama. The original 24-foot road was built on chert, a hard flinty material, and within the past three years, a 6-mile section between Albertville and Collinsville was graded to a 30-foot roadway in preparation for a 20-foot double bituminous surface treatment. The Alabama State Highway Department decided that the heavy cut, including considerable rock, required on the eastern end near Collinsville could be made economically by a state force. Accordingly in February, 1945, work was started on this 1.2 miles of grading still remaining, and by the end of May the new road was ready for the surface treatment. The most difficult part lay in a 250-foot cut which had to be excavated to a width of 40 feet, and to a maximum depth of 28 feet to the ditch line. Of the material in this cut 7,000 yards was blue sand rock.

Drilling and Blasting

The rock was drilled by two Gardner-Denver jackhammers operated by a 160-cfm air compressor driven by a Ford V-8 engine, and a Sullivan wagon drill powered by an air compressor with a capacity of 280 cfm driven by a Caterpillar D13000 engine. One-inch drill steel was used with the jackhammers, beginning with 2-foot lengths and increasing to a maximum of 12 feet in 2-foot increments. Bit sizes with these drills ranged from 2¼ to 1 inch. On the wagon drill, 1½-inch steel was used, starting with 4-foot lengths and increasing to 8, 12, and 16-foot lengths, with bits from 2½ to 1¼ inches in size. A bit was usually good for drilling 2 feet on either the jackhammers or wagon drill, after which they were sent away to be sharpened.

Holes were drilled on 5½-foot centers and loaded with two sticks of du Pont 40 per cent dynamite, with attached exploders. In addition, 8 pounds, or two-thirds bag, of free-running dynamite was poured into each hole. The first lift to be blasted from the top of the cut was 16 feet deep. This was taken out in four sections each measuring 125 by 20 feet, or about one-quarter of the area of the cut. Thirty holes were shot at a time, breaking the rock into pieces readily handled by the shovel. When the upper lift was cleaned up, the lower 12-foot lift was blasted away.

Grading Operations

A Byers shovel with a ⅝-yard dipper on a 14-foot boom loaded the rock into five Ford 1½-ton dump trucks which hauled the material ¾ mile to a fill section, where it was placed by a Caterpillar D7 tractor with dozer. Two other locations on this project also contained rock which was removed with the same equipment.

Borrow was a cherty soil, which was loaded and moved by a LeTourneau 8-yard scraper pulled by a Caterpillar D7 tractor. The scraper took a 4-inch-deep cut along a 200-foot length, and the average haul was about 500 feet. This material came from a roadside borrow pit located about midway of the job and was placed in rocky cuts and other areas where needed in producing a satisfactory subgrade. Chert and sand-gravel from distant pits were also hauled into the rock-cut areas for a

(Concluded on next page)

Rounding the Curve of "Safety first" at Low Cost—
TUTHILL GUARDS

CURVES, embankments, bridge approaches, grade crossings—all are made safe with the TUTHILL Guard. It combines *high visibility, flexibility* plus *strength, low-cost installaton,* and *economy* of *maintenance.* Available for maintenance or installation. *Request details.*

Pacific Coast Manufacturers and Distributors: U. S. SPRING & BUMPER CO., Los Angeles, Calif.

TUTHILL SPRING COMPANY
762 W. POLK ST. CHICAGO 7 ILL.

NEW FEATURES...STARTLING PERFORMANCE
ABILITY TO "TAKE IT"... MORE PORTABLE
FASTER MIXING!

They're "go getters" when it comes to pouring yardage, durability and speedy portability. You can expect great IMPROVEMENTS in CMC Mixers and you won't be disappointed. More than a third of a century of "know how" plus a top record in building Mixers for Uncle Sam in the war years combine to bring you the kind of equipment you will need to handle the mass of WORK THAT'S WAITING. These new CMC's come in all standard sizes, including the new 6, 11, 16S models.

Watch

For the Latest in

PUMPS . . MIXERS . . CONCRETE GUNS . . BATCHING AND PLACING EQUIPMENT . . HOISTS . . POWER SAWS ELECTRIC GENERATORS!

CONSTRUCTION MACHINERY CO.
WATERLOO • IOWA

Deep Rock Cut

(*Continued from preceding page*)

base course for the bituminous pavement. Final grading on the cut and fill was done by a Galion 101 power grader with a 12-foot blade, after it was compacted in 8-inch layers by a sheepsfoot roller pulled by the D7 tractor.

Personnel

An average of 500 yards of rock was excavated in a 12-hour day by the maintenance force of 22, half of which were white free labor and the rest colored convicts from the Scottsboro camp. In addition to L. F. Sheffield, Superintendent in charge of the work, the free labor was composed of a shovel operator, tractor-dozer operator, tractor-scraper operator, mechanic, five truck drivers, and a foreman who supervised the prison labor. The latter operated the jackhammers and wagon drills and did the common labor work.

The material moved on this 1.2-mile section of road included 13,200 yards of earth excavation, 15,000 yards of rock, and 8,200 yards of base-course material, a mixture of chert and sand. A contract to lay a 20-foot double bituminous surface treatment of asphalt and slag was let in the summer for the 6-mile section of road from Collinsville west to Dawson on Ala. 68, part of which is over this new location.

For the Alabama State Highway Department which did this work, G. W. Phillips is Construction and Maintenance Engineer, and J. F. Tribble, Assistant Construction Engineer. The work was done in the First Division of which S. E. Caudill is Division Engineer. R. A. Guy is in charge of all Highway Department convict camps.

Lima Names Distributors

Recently named distributors for Lima shovels, cranes, and draglines, are Morgan's, Inc., 111 W. Broad St., Savannah, Ga., and R. J. Stone, "Stone the Crane Man", 2457 Woodward Ave., Detroit 1, Mich. They will handle Lima shovels of capacities ranging from ¾ yard to 5 yards, and cranes of from 13 to 100 tons, the Shovel & Crane Division, Lima Locomotive Works, Inc., Lima, Ohio, has announced.

Steel Road Joints Give Permanent Load Transfer

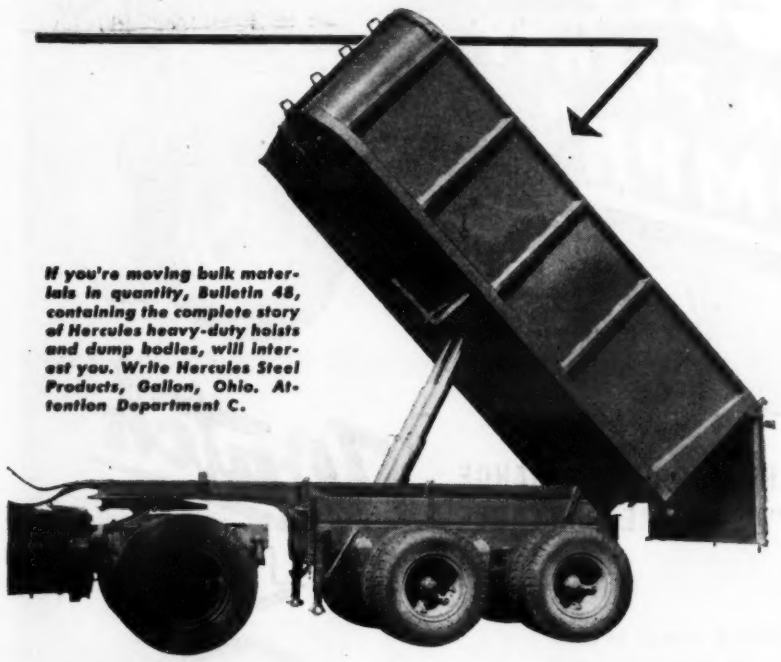
Keylode steel contraction transverse and longitudinal joints for concrete pavements, designed to provide permanent load transfer by the interlock method, are fully described in a 4-page bulletin just received. This contraction joint is a rigid metal form which molds the concrete into a continuous interlocked joint, the concrete providing its own load transfer across the joint. The light steel construction and standardized design permit low cost, according to the manufacturer, and no special installation equipment is required. The catalog contains illustrations of the Keylode joint and its application, and a summary of the research leading to its development.

Copies of this bulletin, as well as complete data and specification details, will be sent to interested contractors and highway engineers who write direct to the Highway Steel Products Co., 14th & McKinley Sts., Chicago Heights, Ill. Just mention this publication.

RAILROAD WITHOUT RAILS!

Just two trips with one of these 22-ton Hercules trailer dump bodies and you've moved a full railroad carload of limestone, gravel, coal, crushed stone or any other bulk material. These designed-for-duty, built-for-business dump bodies carry 17 yards in every load—that's moving material the BIG way!

And it's the economical way, too, for one 22-ton load, moved quickly and easily in a Hercules trailer unit, eliminates numerous trips with dump trucks of lesser capacity, cuts time, labor and operating costs to the minimum. This extra capacity also makes it practical to move materials longer distances by truck, avoiding additional handlings required with combined truck-rail hauling.



If you're moving bulk materials in quantity, Bulletin 48, containing the complete story of Hercules heavy-duty hoists and dump bodies, will interest you. Write Hercules Steel Products, Galion, Ohio. Attention Department C.

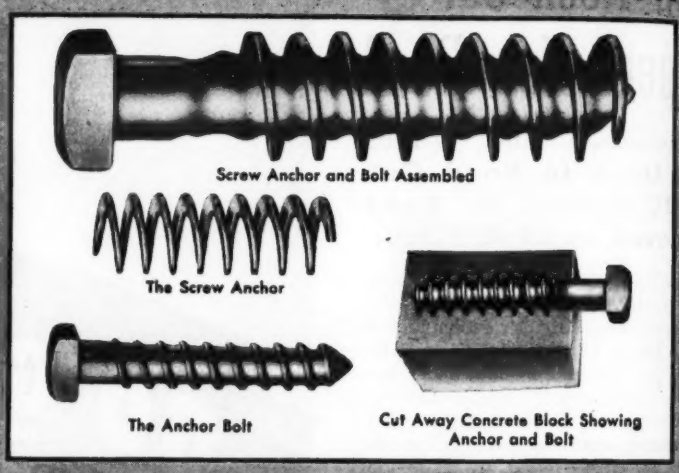
Ask About Turn-O-Matic Cement Boxes for Bulk Cement—Now Available—Write Today

HERCULES

DUMP BODIES AND HYDRAULIC HOISTS
SPLIT SHAFT POWER TAKE-OFFS • COAL CONVEYORS

HERCULES STEEL PRODUCTS COMPANY GALION, OHIO

RICHMOND
SCREW ANCHORS *and* BOLTS FOR CONCRETE CONSTRUCTION



Richmond Screw Anchors and Bolts provide:

- A Fastening Device in Concrete which cannot disintegrate.
- A Steel Reinforced Lining for a Concrete Thread.
- ANCHORAGE Strength in Concrete Greater than Full Strength of Bolt.

Richmond Screw Anchors and Bolts are used:

- For Permanent Fastening of Fenders and Fixtures to Concrete Piers, Docks and Structures.
- For Temporary Support Bracket Anchorage for Falsework to Concrete Columns, Bents, Walls and Structures.
- For Temporary Anchorage of Heavy Forms; such as, Tunnel Arch Forms to Invert Concrete.

Richmond offers without obligation, consultation on problems relating to anchorage to concrete.

FORM-TY Engineering Guide and Screw Anchor and Bolt Folder on Request.

SEE OUR CATALOG IN SWEET'S

RICHMOND SCREW ANCHOR COMPANY, INC.
816-838 LIBERTY AVENUE • BROOKLYN, N.Y.
MANUFACTURING SINCE 1911

Get Behind the VICTORY LOAN!
Every Victory Bond Helps to
Bring our boys back to America!
Provide the finest of medical care
for our wounded heroes!

ew Base and D.B.S.T. Improve Prison Road

o Contracts Awarded to ummey & Crummey for ,000 Square Yards of Base and Surfacing

a 3,000-foot road connecting the two e prison buildings, one for men and other for women, 6 miles west of lsville off State Route 147 in Tatt- l County, southeastern Georgia, was roved last spring by a double bitu- ous surface treatment. Prior to the face treatment, a pebble-soil base rse was laid after some preliminary ding on the original dirt road, which s constructed by convict forces in 7-38 after the building of the new lsville State Prison by the PWA. e laying of the base course and sur- e treatment were done under sepa- e contracts, both of which were rded by the State Highway De- rtment of Georgia to Crummey & rummey Construction Co. of Rochelle, . This contracting firm is operated a man and his wife, which accounts the dual use of the name.

n addition to the 3,000-foot road necting the two main prison build- s, a 2,000-foot stretch of new access d was built to the prison dairy barn r the unimproved portion of Ga. 147 st of the white-walled steel-barred- ndow buildings. Several drives and rsections along these roads were ilarly improved, making a total of ,000 square yards of base course and rface treatment in the two contracts.

Grading and Base Course

The 3,500 cubic yards of grading, hich was included in the first contract, nsisted mainly of shaping up the ade in the original road and leveling f any irregularities that had developed ce its construction seven years ago. o new material was needed and the adbed was trued to its proper grade a LeTourneau 10-yard scraper lled by a Caterpillar D8 tractor. On e 34-foot roadway a 21-foot base of bble soil was then laid to a compacted pth of 8 inches.

For security reasons, this prison is cated in a sparsely settled area of the te, with the nearest railroad 13 miles ay, so in order to avoid high trucking arges local material was used for the se course. The pebbly soil, which s laid on the dirt road, is found in undant quantities in some fifteen to enty counties in this section of eorgia, and is a granular material of od bearing capacity. The State fur- shed the contractor a borrow pit con- ining this soil located at the inter- ction of Ga. 147 and the new road.

To this piece of prison property the ntractor moved a Lorain 40 ¾-yard ovel, and excavated the ground to an erage depth of 18 inches which was fficient to insure an adequate amount the three constituents, clay, pebbles, d topsoil. In order to mix these three to a good binder material, the shovel erator worked the soil through his cket a couple of times to get an even stribution. Then he piled the pebbly il into a windrow nearly 10 feet high, the shovel followed a direct course thering in material within the reach the boom. This windrowing also as- ted in the further mixing of the soil.

Spreading and Rolling

From this windrow the shovel loaded e material into seven Ford 1½-ton mp trucks, holding 3 yards each, hich made an average haul of 1,500 et before unloading on the roadbed. e pebble soil was spread to a loose pth of 11½ inches by a Caterpillar 12 power grader. Further mixing and pulverizing were achieved by the use of a disk harrow pulled by a Ford- son rubber-tired tractor. The harrow had two rows of 16-inch-diameter disks, twelve to a row, the front row throwing the material out, and the next row re- versing the direction.

Following the harrow came a Ford truck on which was mounted a 1,000- gallon water tank equipped in the rear with a 20-foot spray bar. Water for wetting down the base course was ob- tained from the prison hydrant system and distributed from the tank by grav- ity flow. While this watering was in progress, the base course was shaped with the blade on the power grader, and compacted by a pneumatic-tire roller so that the final depth of pebble

(*Continued on next page*)

HERE'S HOW

SOLVAY CALCIUM CHLORIDE

CAN HELP YOUR WINTER CONCRETING

It's **proved:** The addition of Solvay Calcium Chloride to portland cement provides:

1. **QUICKER SET**—Tests prove that the time of initial and final set is reduced by two-thirds with Solvay Calcium Chloride in the mix.
2. **HIGH EARLY STRENGTH**—Solvay Calcium Chloride speeds development of strength . . . provides 3 days' strength in one day . . . 7 days' strength in 3 days. This is important during cold weather, which slows action of portland cement.
3. **COLD WEATHER PROTECTION**—Solvay Calcium Chloride offsets dangerous effects of sudden drops in temperatures, shortens protection period, adds extra protection against freezing.

Solvay Calcium Chloride helps winter concreting without changing the normal chemical action of portland cement—and at a cost so low that the savings in finishing, forms, protection and labor far outweigh the cost of the calcium chloride.

Send for FREE Booklet giving complete details—"Calcium Chloride and Portland Cement." Write to Dept. 94-11.

SOLVAY SALES CORPORATION

40 RECTOR STREET NEW YORK 6, N. Y.

There IS a Reason
Gar Wood—World's Largest Manufacturer of Truck and Trailer equipment—earned this leadership through ability to engineer and build units of such outstanding performance that men who know equipment best specify Gar Wood.
BUY VICTORY BONDS
GAR WOOD INDUSTRIES, Inc.
DETROIT 11 MICHIGAN
GW

Other Products: • TANKS • HEATING EQUIPMENT • MOTOR BOATS

New Base and D.B.S.T. Improve Prison Road

(*Continued from preceding page*)

soil was 8 inches for a 21-foot width.

Surface Treatment

After a couple of weeks of traffic over this base course, the road was ready for the surface treatment which was included in the second contract. All loose material was cleaned from the surface by a Grace power broom and blower pulled by the Fordson rubber-tired tractor before the shooting of the prime coat. The prime consisted of RT-2 tar applied over the full 21-foot width at the rate of 0.3 gallon to the square yard by an Etnyre 1,000-gallon distributor mounted on a Ford truck. At intersections and driveways where the spray bar could not be used to the best advantage, a long flexible hose from the back of the distributor was employed for applying the prime.

The tar was hauled 70 miles from the Koppers Co. plant in Savannah, Ga., in the contractor's 2,000-gallon insulated tank mounted on a Ford truck. This tank is also equipped with flues to which a steam line from the prison was attached, whereby the temperature of the AC-15 used in the seal could be raised for easy pumping into the distributor. The pump on the distributor was used for the transfer, and the tar was applied at a temperature between 125 and 140 degree F. During a period of from 48 to 72 hours, in which the road was closed to traffic, the tar had penetrated to a depth of from ¼ to ½ inch.

The prime coat was then covered with a thin layer of sand from a local pit, scattered from slowly moving trucks by men working with hand shovels. Just enough sand was used to prevent cars' picking up the tar. Traffic was then permitted over the road for a 10 to 15-day period while the tar was curing, after which the surface was cleaned by the Grace power broom and blower as before.

Liquid Seal

For the double surface treatment, AC-15 asphalt with a penetration of 150 to 200 was used in both seals. This material was purchased from the Mexican Petroleum Corp. at Savannah, brought to the job in the same manner as was the tar, and heated with steam from the prison pipes to a temperature of around 250 degrees F. It was then pumped from the transfer truck to the distributor, heated some more, and applied to the road at a temperature of 275 to 350 degrees F at the rate of 0.4 gallon to the square yard for the full pavement width of 20 feet. The base course extends 6 inches beyond the pavement at each side to prevent raveling caused by insufficient support at the edges.

The fleet of seven Ford trucks was now outfitted with Gibbes spreader boxes at the tail-gates for use in placing the cover coat of slag at the rate of 45 pounds to the square yard, one lane at a time as the boxes were set to a width of 10 feet. The gradations of this slag were as follows:

Sieve Size	Per Cent by Weight Passing
1¼-inch	100
1-inch	85-100
⅜-inch	20-40
½-inch	0-7
#8-inch	0-2

After the slag was spread, three or four men went over the surface with hand brooms to see that all scantily covered spots received a uniform amount of the aggregate, follow

(*Concluded on next page*)

ELECTRICITY

1500 WATT PORTABLE

WHEN YOU WANT IT
WHERE YOU WANT IT

• For Operating Power Tools • Floodlights • Field Repair Shops • Service Trucks • Paving Machines • Power Shovels • Earth Moving Equipment, etc.

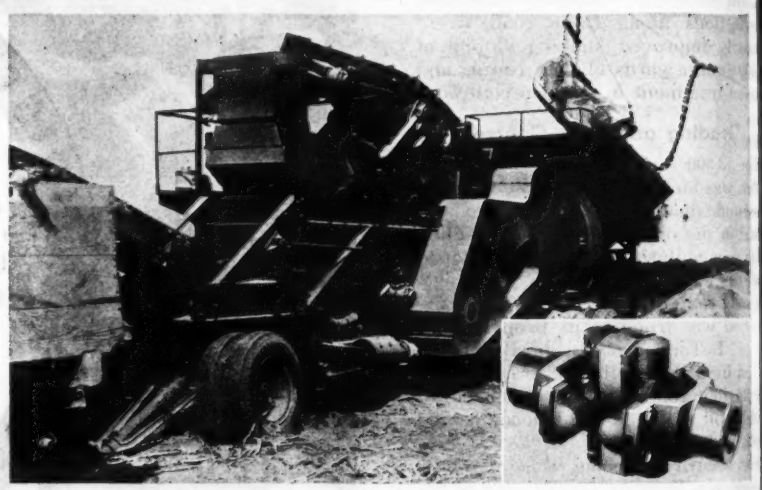
Portable Unit
4-Wheel Trailer
2-Wheel Trailer

There's an economical "U. S." unit for every construction-work need. Engineered by men with practical, out-in-the-field experience. Built to take every punishment — and operate faithfully for long continuous hours. Sizes from 500 watts to 15 KW. Skids, rings, porter bars, and trailer mountings available.

"U.S." BUILDS A COMPLETE LINE of Gasoline and Diesel Electric Plants up to 75 KW—for standby, continuous duty, battery-charging, and portable uses. Write for literature, stating type of unit and capacity required.

UNITED STATES MOTORS CORP.
554 Nebraska Street Oshkosh, Wisconsin
Factory representatives strategically located throughout U. S. A. and Canada.

"U.S." ELECTRIC PLANTS



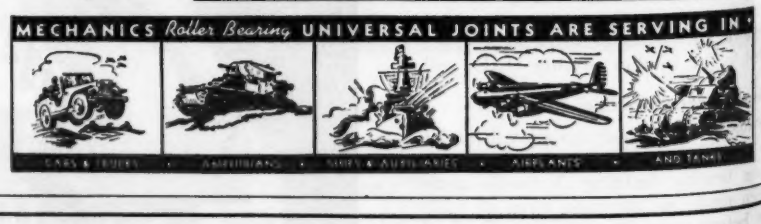
MECHANICS Close-Coupled Roller Bearing UNIVERSAL JOINTS

Save Space —in— Restricted Quarters

MECHANICS close-coupled type Roller Bearing UNIVERSAL JOINTS are specially designed for operation within cramped quarters, and where shafts are out of alignment. These joints fit into spaces that engineers formerly considered too short for universal joints. Let out engineers show you how MECHANICS close-coupled Roller Bearing UNIVERSAL JOINTS conserve space and compensate for offset shafts, in your new or improved models.

Mechanics Universal Joint Division
BORG-WARNER CORPORATION 2026 Harrison Avenue Rockford, Illinois

MECHANICS Roller Bearing UNIVERSAL JOINTS ARE SERVING IN



CARS & TRUCKS • AMPHIBIANS • BOATS & AUXILIARIES • AIRPLANES • AND TANKS

Whatever The Job...

HENDRIX Lightweight DRAGLINE BUCKETS

DIG RIGHT IN!

⅜ to 30 Cubic Yards

★ 20% to 40% lighter than other buckets, type for type.
★ All welded construction for greater strength and durability.
★ Manganese Steel chains, fittings, and reversible tooth points.
★ Full Pay Load every trip, even in wet diggings.
★ Three types: light, medium, and heavy duty.

Write for literature or ask your dealer

DESOTO FOUNDRY INC. • MANSFIELD, LOUISIANA

SUPPORT YOUR PAYROLL SAVINGS PLAN!

ew Base and D.B.S.T. Improve Prison Road

(Continued from preceding page)

ich the surface was rolled by a Buf-o-Springfield tandem 5-ton roller. raffic was allowed over the road for bout one week and then the power oom swept the surface, casting off to e side any excess material that did ot bond fully. To assist traffic in forc-g the aggregate down into the bitu-en, the pneumatic-tire roller was also alled over the road, particularly in ose areas where the wheels of passing ars were less frequently driven, as for stance along the very edges of the avement.

The second treatment followed, again ith AC-15 asphalt at the same tem-erature but with the application this me at the rate of 0.3 gallon to the quare yard. The slag cover coat for e top treatment had finer gradations n the following proportions, applied 25 ounds to the square yard.

Sieve Size	Per Cent by Weight Passing
½-inch	98-100
No. 4	30-70
No. 10	0-15
No. 16	0-3

This cover coat was likewise hand-roomed to fill in all voids, after which was rolled, the excess aggregate swept off the surface, and the road opened to raffic immediately.

The slag for the two cover coats was urchased from the Birmingham Slag Co. and shipped by rail in hopper-bot-om cars from Birmingham, Ala., 350 miles to the siding of the Seaboard Rail-way at Manassas. Here a trap was built beneath the ties, and one end of a Burch conveyor belt was placed so that he car unloaded directly to this belt. The other end of the conveyor was high enough off the ground so that the trucks backed under and were loaded without he material being rehandled. A haul of 13 miles from the siding to the job ite was then necessary.

Quantities and Personnel

On April 26 work began on this road improvement which was opened to traffic on June 15. An average force of fifteen men was employed, including seven truck drivers, an operator and a driver on the distributor, a roller opera-or, a tractor operator, and four labor-ers. The first contract, including the grading and laying of the base course, went for $7,500, while the second con-tract, for the double bituminous surface treatment, amounted to $13,270, making a total of $20,770. The major items were as follows:

Pebble-soil base material	5,500 cu. yds.
Excavation	3,500 cu. yds.
Prime, RT-2 tar	5,040 gals.
Asphalt, AC-15	11,760 gals.
Coarse slag	420 tons
Fine slag	252 tons

Resident Engineer for the State High-way Department of Georgia was R. E. Carswell, while Ray Harrison was Su-perintendent for Crummey & Crummey. The job was located in Division No. 5 of the Highway Department of which D. D. Hankins is Division Engineer and A. H. Long is Assistant Division Engineer.

More Fruehauf Service In Nine Western Cities

Greatly increased service facilities for the users of the Fruehauf line of trailers throughout the west are being provided by the Fruehauf Trailer Co., Detroit, Mich., which has recently announced that branches in nine western cities now have building projects completed or well under way. These plant expan-sions are located in Seattle, Wash.; Salt Lake City, Utah; Fresno, Calif.; Phoe-nix, Ariz.; Spokane, Wash.; San Diego, Calif.; Portland, Oreg.; El Paso, Texas; and Billings, Mont.

In all plants facilities are provided for new body construction but emphasis is placed on repair and maintenance services for all makes of trailers. Each plant has a fully equipped machine shop, modern steam-cleaning and spray-painting equipment, and extensive storage space for spare parts and accessories.

Canadian Distributor Is Appointed by Teco

The transfer of Canadian distribution rights of Teco timber connectors and other products from V. H. McIntyre, Ltd., to J. E. Goodman, well known Toronto engineer, has been announced by The Timber Engineering Co., Washington, D. C.

The newly formed Goodman organization will continue the timber engineering, lumber information, and sales services established by the late Verne H. McIntyre. Mr. Goodman formerly served as Project Engineer for the McNamara Construction Co. of Toronto.

Metal-Culvert Group Names Welden Director

The Association of Metal Culvert Manufacturers in New England has appointed Elmer C. Welden, former Deputy Commissioner of the Connecticut State Highway Department, as Engineering Director, with headquarters at West Hartford, Conn. Mr. Weldon will provide engineering and advisory services to interested authorities throughout New England on a more extended and effective use of metal culvert pipe.

The Association comprises the Bancroft & Martin Rolling Mills Co. of Portland, Maine; Berger Metal Culvert Co., Somerville, Mass.; Penn Culvert Co., Somerville, Mass.; and the New England Metal Culvert Co., Boston, Mass.

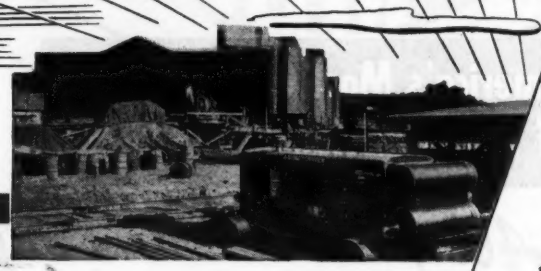
Davey Names New Dealers

Sales and service outlets for Davey pneumatic saws, power take-offs, and air compressors in the St. Louis, Mo., and Grand Rapids, Mich., territories have been announced by the Davey Compressor Co., Kent, Ohio. The Clearview Equipment & Mfg. Co., 1320 So. Grand Blvd., St. Louis, will serve eastern Missouri and southern Illinois, with Davey activities being supervised by Oscar J. Fickeissen, Vice President. Western Michigan will be served by the E. K. S. Equipment Co., 18 Grandville Ave., S. W., Grand Rapids, under Newell L. Snyder, President.

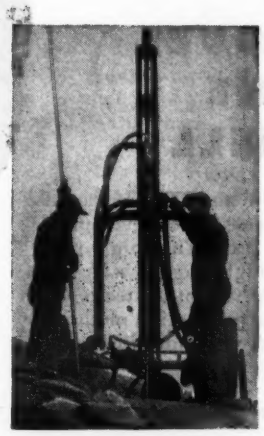
LeTourneau Appoints New Caribbean Dealers

Three exclusive distributors for LeTourneau construction equipment in the West Indies have been appointed by R. G. LeTourneau, Inc., Peoria, Ill. Masterton Ltd., 12-16 Hanover St., P. O. Box 73, Kingston, Jamaica, will serve the island of Jamaica; Garcia Commercial, Inc., P. O. Box 4344, San Juan, P. R., will fill Puerto Rican needs; and Anton Kneer, Port au Prince, Haiti, will serve that republic.

A NEW HORIZON FOR POSTWAR JOBS



To keep pace during the period of great postwar activity—to get the jobs done fast and well at the lowest cost—you will want Gardner-Denver equipment. Proved on the most grueling jobs, its rugged construction and superior design permit continuous operation—assure minimum operating and maintenance costs.



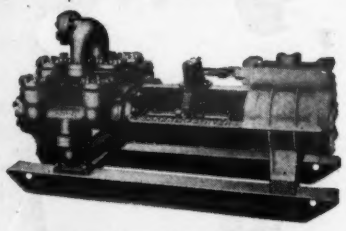
Gardner-Denver Wagon Drills—highly maneuverable on hillside or rough ground, spot quickly, drill fast.

Gardner-Denver Sinkers—easily handled because of their perfect balance and smooth operation—speed up drilling.

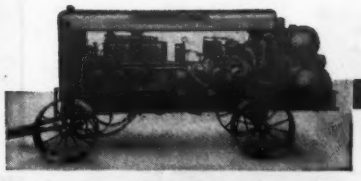
Gardner-Denver Spaders—for faster footage in any digging job.

Gardner-Denver Pavement Breakers deliver fast cutting blows for demolition work.

Gardner-Denver Backfill Tamper—fast, powerful, easy to walk over the fill.



Gardner-Denver Grout Pumps—built tough—offer resistance to the wear caused by abrasive cement.



Gardner-Denver Water Cooled Compressors—completely water jacketed to provide continuous cool operation and discharge temperature.

For complete information on Gardner-Denver equipment, write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER Since 1859

A Plan to Finance Secondary Highways

The State Highway Commission and County Supervisors Suggest Method To Secure Greater Improved Mileage For Mississippi Farmers

✦ A PLAN which has been generally accepted by the State Highway Commission of Mississippi and by the Board of Supervisors Association representing the counties would take 2,200 miles of road which is being maintained by the State, and not included in the regular Federal-Aid system, and add to this 2,200 miles of county roads to comprise the first increment of the farm-to-market road system for the state. The farm-to-market road mileage in each county would be determined by applying the same formula to the 4,400 miles that was applied by the Federal government in determining the amount of money to be distributed to the state, namely, one-third area, one-third rural population, and one-third rural-delivery and star-route mileage.

It was suggested by T. J. Lowry, Highway Commissioner from the northern district of the state, that the State Highway Department should match $5,000,000, or one-half of the $10,000,000 Federal secondary-road fund available to Mississippi, and spend it on the state secondary or farm-to-market road system, and that the other $5,000,000 of the Federal fund be matched by the counties and expended on the county farm-to-market road system. This would, however, give only a $10,000,000 county farm-to-market road program.

Plan for Larger Program

In addition, Mr. Lowry recommends that the Legislature furnish, as a state grant, $10,000,000 from the surplus in the Mississippi state treasury and make it available for expenditure on the county farm-to-market road system, $5,000,000 of this $10,000,000 state grant to be used in matching the $5,000,000 Federal fund that is available for expenditure on the county farm-to-market road system. This would guarantee a minimum $10,000,000 farm-to-market road program in the counties.

It is further suggested that the counties should be given the privilege of participating in the county program by furnishing funds in the same amount as the Federal allocation to the individual county, and if they elect to avail themselves of this privilege, the remaining 50 per cent, or $5,000,000, of the state grant would be used to match the counties' appropriations. This would make possible a $20,000,000 county farm-to-market program and speed the necessary improvements on the secondary system.

If any one county's pro rata share of the $5,000,000 Federal fund amounted to $50,000 and the county should put up $50,000, then the State would make a grant of $100,000 which would match both Federal and county appropriations and would give to that county $200,000 to be expended on its farm-to-market road system, with the county putting up only $50,000. However, if the county were not financially able to appropriate this $50,000, then the State, from the state grant, would match the Federal $50,000, which would give the county only $100,000 to be expended on its farm-to-market road system. In case any county should decide not to match these funds, then the State Highway Department would have the privilege of matching the state grant that was available to that county and would spend the money on the State Highway Department's secondary or farm-to-market road system, which could be done and still not complete the state secondary system.

The program has received the general approval of the State Highway Commission and the county supervisors. It remains for the State Legislature to take appropriate action.

Bucyrus-Erie Dealers In Midwest Territory

The A. E. Hudson Co., at the foot of Morton St., Peoria 3, Ill., has been appointed by the Bucyrus-Erie Co., South Milwaukee, Wis., to handle its complete line of excavating and tractor equipment in the central Illinois region south of and including Henderson, Warren, Knox, Stark, Bureau, LaSalle, Grundy, Ford, and Iroquois Counties, and north of and including Hancock, Schuyler, Cass, Menard, Logan, Macon, Moultrie, Cumberland, and Clark Counties. The Geo. F. Smith Co., St. Louis, Mo., continues as distributor in southern Illinois; the Great Lakes Supply Corp., Chicago, Ill., serves Bucyrus-Erie customers in the northeastern Illinois territory; and Mercer, Henry, Rock Island and Whiteside Counties are covered by Henry Alter & Sons, Davenport, Iowa.

The Indiana Equipment Co., Inc., 32 W. Market St., Indianapolis 4, Ind., has been named distributor for the complete Bucyrus-Erie line of excavating and tractor equipment in central and northeastern Indiana, north of but not including Knox, Daviess, Martin, Lawrence, Jackson, Jennings, Ripley, and Dearborn Counties, and excluding Lake, Porter, and LaPorte in the northwest.

The Bucyrus-Erie district office at 105 W. Adams St., Chicago 3, Ill., cooperates with all excavator dealers in both states.

Shunk Snow Plow and Ice Removal BLADES
Proved record of superior performance. Made of specially developed steel to withstand severe service conditions.
FOR ALL TYPES AND MODELS OF SNOW PLOWS
Various widths, lengths, thicknesses--flat or curved--standard or special--punched ready to fit your machine.
SHUNK SAW-TOOTH ICE BLADE
Amazingly effective. Thoroughly breaks up and removes heavy, slippery ice and snow formations. Replaces all types of snow plow blades or maintenance units. Write for Bulletin and name of nearest Distributor.
AEM
Shunk
MANUFACTURING COMPANY
ESTABLISHED 1854
BUCYRUS, OHIO.

PMCO
America's Most Complete Line of Material Handling Buckets
All purpose-
• SHOVEL
• PULLSHOVEL
• DRAGLINE
• CLAMSHELL
• FRONTS, BOTTOMS, SCOOPS and TEETH shown in red on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.
On the ½ yd. and ¾ yd. Shovel, Pullshovel, and Dragline Buckets, all teeth are interchangeable — a great advantage to operators.
Experience Counts
See your shovel man or equipment dealer about PMCO Buckets and Dippers.
"Quality Since 1880"
PETTIBONE MULLIKEN CORP.
CHICAGO 51, U. S. A.
WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES.

ubrication-Maintenance Guide Reissued by Gulf

A revised edition of the "Lubrication d Maintenance Guide for Contrac- rs' Equipment" has been issued by the lf Oil Corp., 3800 Gulf Bldg., Pitts- rgh 30, Pa., and is available without ligation to readers of this magazine o send their requests to Gulf.

Included in the 72-page booklet are structions and advice on the care of e various units to be found among ntractors' equipment, including en- es and their various parts, wire rope, eel bearings, hydraulic systems, awler mechanisms, air compressors, mps, and storage batteries. General lubrication data, engine lubrication-oil recommendations, tractor-capacity and lubrication recommendations, and composite tractor lubrication charts are included. Suggestions are made for the storage and handling of equipment, tires, petroleum products, bulk fuel, and other supplies. Concluding this useful booklet is a list of the various Gulf lubricants and their uses.

Painting Steel Studied

The relative durability of forty different priming coats and fifteen different top-coat paints for plain and galvanized steel surfaces, when subjected to accelerated laboratory and outdoor exposure tests, is described in Building Materials and Structures Report 102, published by the National Bureau of Standards as the third and final report of a series covering investigations on pretreatments and paints for use as corrosion preventives. Previous findings were given in B. M. S. 8 and B. M. S. 44.

Particularly effective protection against corrosion was observed when primings of the synthetic resin-zinc chromate type were used over a phosphate-treated surface and finished with an aluminum top coat. Special attention was given to the effect of pretreatment of new galvanized steel.

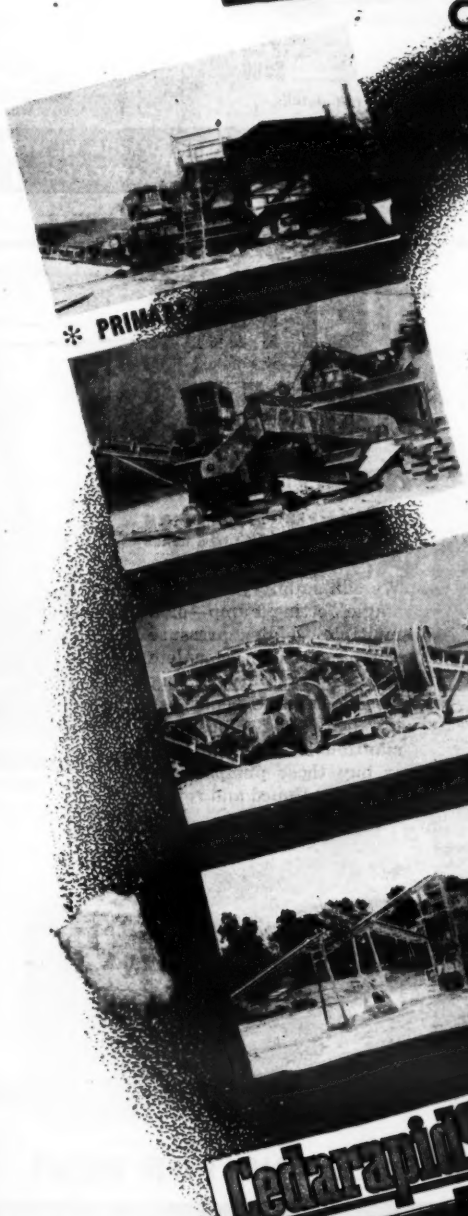
Copies of this report may be secured direct from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price: 10 cents (stamps not accepted).

Gar Wood to Redesign Its Line of Equipment

Plans for applying modern industrial design to its bulldozers, dump trucks, and other products have been announced by the Gar Wood Industries, Inc., 7924 Riopelle St., Detroit 11, Mich. The firm has retained Norman Bel Geddes, noted industrial designer, to restyle its entire line. Gar Wood also makes winches, cranes, dirt-moving scrapers, tanks for carrying liquids, motor boats, and heating equipment.

...a peek into the future—

Cedarapids Unitized Plant Economy for tomorrow's jobs



These 4 Units Make a Dozen Complete Plant Combinations for ANY Job Needs!

Each element of the Cedarapids Unitized Plant is a complete unit in itself, balanced for high capacity used alone or with other matched sizes to handle every range of production volume.

What a Unitized Plant Will Mean to You

The basic economy of standardized machines capable of instant adaptation to special job conditions needs no explanation to operating contractors. Savings begin in lower purchase costs, and extend straight down the line through maintenance, repairs, and labor-saving flexibility to the ultimate goal of profitable contracts. Working machines are the only money-making machines, and the Cedarapids Unitized Plant is designed to give you the equipment flexibility necessary to keep the good contracts coming in, the plant on the job. Be sure you find out all about Cedarapids Unitized Plants BEFORE you buy your plant requirements for the FUTURE—and what a future it is if you have the right portable plant equipment! See your Iowa Distributor for complete details.

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA

Cedarapids Built by IOWA

THE IOWA LINE of Material Handling Equipment Includes:

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS
PORTABLE POWER
CONCRETE
GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD-MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS
FEEDERS—TRAPS

New Post-War Model Of Electric Welder

The first post-war model to be announced by Hobart Bros. Co., Box CE, Troy 1, Ohio, is a light-weight full-capacity 200-ampere engine-driven arc welder with a wide range of 40 to 275 amperes. Completely enclosed in a compact steel canopy with hinged side panels, this new model is powered by a sturdy 26-hp four-cylinder engine.

The Multi-Range dual control of welding current provides easy adjustment of voltage and amperage relationship to the fine degrees that are required of present and future welding applications or for use with all present and forthcoming electrodes, the manufacturer reports. The wheel of this Multi-Range dual control on the front of the generator control panel corresponds to the station selector of a modern radio receiver, and the volt-ampere adjuster located inside the wheel operates similarly to the radio volume control. With 10 ranges of welding current and 100 steps of volt-ampere adjustment in each range, the Hobart Multi-Range dual control makes available 1,000 combinations of open-circuit voltage and welding current for selecting any desired arc characteristics.

Remote control, a standard feature of all Hobart welders, allows the volt-ampere adjuster to be easily removed from the control panel for use with an ordinary extension cord so that the operator can adjust the welding heat right at the work, eliminating repeated trips between the welding job and the machine. Standard equipment also includes the mercury-type idling device which automatically idles the engine when not in use, to cut down on fuel consumption and engine wear.

This new welder is available with skid mounting, beveled at both ends with tubular end cross members for easy skidding, or as a two-wheel pneumatic-tired trailer, or with 16-inch shop-type wheels.

Further information may be secured direct from the manufacturer.

Road-Roller Catalog

The line of road rollers and roller equipment made by the Acme Road Machinery Co., Frankfort, N. Y., is described and illustrated in literature which may be secured by interested contractors and state and county highway engineers direct from that company. Acme motor road rollers are available in 5, 7, 8, 9, 10, 12, and 15-ton sizes, while its tandem rollers are made in 4, 5, 6, 7, 8, 9, and 10-ton models. Lighter-type Pony rollers, equipped with grading blade and scarifier, are also described.

YOU PROFIT with 3 WAYS

WYCO CONCRETE VIBRATORS

FLEXIBLE SHAFT DRIVE

SAVE LABOR—SAVE MATERIAL

CUT PLACEMENT COSTS 50%

Stronger, denser high quality concrete obtained. Honeycombing, air bubbles, and scaly surfaces eliminated. Best tool ever devised for vibration of mass concrete of low water cement ratios.

Preferred by contractors everywhere for high efficiency and low maintenance costs.

GASOLINE OR ELECTRIC MOTOR DRIVE

WYCO features: Hardened spud vibrator head completely sealed—nose hardened alloy steel—cast steel rotor—2 Norma Hoffman roller bearings, 1 ball thrust bearing, for dependable rotor action in severest conditions—greatest amplitude of vibration for size of vibrator head—protected oil plug.

Available with interchangeable tools for grinding, surfacing, drilling, wire brushing, sawing, etc.

ELECTRIC MOTOR DRIVE WYCO VIBRATORS

3 types: 2 for AC, single or 3-phase constant speed, direct or jack shaft step-up type. For both AC and DC a Universal Motor is supplied. No. UV918-A, 1½ H.P. Universal Motor..... $260

Write for Catalog and full details.

WYCO GASOLINE POWER VIBRATORS

Gasoline Vibrators mounted on wheelbarrow or stationary swivel base. Standard air-cooled engine 3 H.P. or 4 H.P. Ball-bearing jack shaft with twin V-belts. Equipped with WYCO Patented Jack Shaft Clutch. Completely disengages engine. Makes starting quick and easy. No. GV903A, swivel base, 3 H.P. $330

WYZENBEEK & STAFF, Inc. 836 W. HUBBARD ST. CHICAGO 22, ILLINOIS

To Speed the Release of YOUR NEW PRODUCTS

If you have a new unit which requires a connecting link between driving and driven parts—whether that link be a friction clutch, a hydraulic coupling or a torque converter—the Twin Disc Clutch Company offers you these important advantages:

1. A broad line of standard friction clutches, hydraulic couplings and hydraulic torque converters*, covering the widest variety of industrial applications.
2. Over a quarter-century of continuous specialization in the building of industrial clutches . . . in developing streamlined production methods which assure uniform quality with lowest practical cost.
3. Adequate records on which performance, operating characteristics and wear-life may be accurately predicted.
4. A competent group of field and factory engineers, skilled in the application of both friction clutches and hydraulic drives, backed by a service organization of 9 factory branches and 31 parts stations.

That is why so many nationally known machinery and equipment manufacturers have found they can speed production, assure efficient performance, and reduce post-sale service by standardizing on Twin Disc Clutches and Hydraulic Drives. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

*Lysholm-Smith type.

Twin Disc Hydraulic Torque Converter, for use where torque multiplication is essential.
Hydraulic Coupling, to assure smooth operation and eliminate destructive shocks and strains.
Twin Disc Power Take-off for engines up to 285 hp. Housing sizes, No. 6 to No. 00 SAE.
Reduction Gear
Power Take-off
Machine Tool Clutch

ARMY E NAVY

TWIN DISC CLUTCHES AND HYDRAULIC DRIVES

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

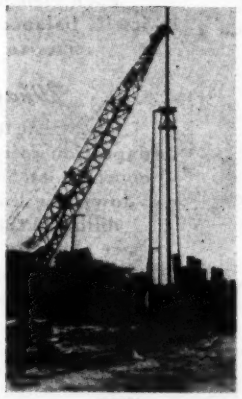
Griffin High Pressure

JETTING PUMPS

with the

GRIFFIN SYSTEM

We can supply you with a single Jetting Pump—or a multiple high pressure pumping system, complete with Heavy Duty Jetting Hose, nozzles, U bends, extra heavy jet pipes and manifolds. You can rent or buy these pumps completely equipped and ready for work.



STEEL

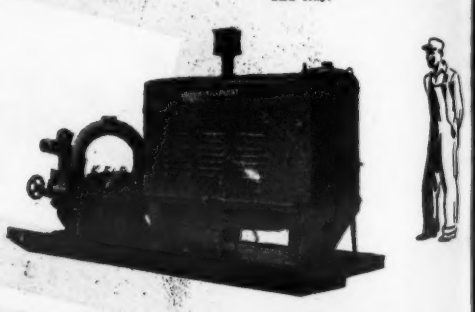
Jetting steel piles with two jet pipes and special rig for accurate location.

WOOD

Wood pile clusters along new boardwalk at Coney Island. Single jet used.

CONCRETE

Concrete Piles with two jet pipes for 25' penetration through sand and clay.



FOR SALE AND FOR RENT

MID-WEST

GRIFFIN EQUIPMENT CO., INC.
548 Indiana Street • Hammond 1662
HAMMOND, INDIANA

SOUTH

GRIFFIN ENGINEERING CORP.
2016 E. Adams St., Jacksonville 5-4516
JACKSONVILLE 2, FLA.

MAIN OFFICE: 881 EAST 141st STREET, NEW YORK 54, N. Y.

GRIFFIN WELLPOINT CORPORATION

This rock-crushing plant operated by Army Aviation Engineers on Guam produced a minimum of 120 tons an hour.

Guam's Airfields

(*Continued from page 6*)

Rock-Crushing Plant

The rock-crushing plant was assembled by setting up three portable Pioneer crushers adjacent to each other in series, so that the rock would be reduced in progressive crushing and screening stages.

The trucks dumped into a 10-cubic-yard feeder hopper with openings, 10 inches wide at one end and widening to 14 inches at the other, over the feeder belt. This feeder belt, driven by power, took only the big stones, at a rate of speed controlled by the hopper operator, to a feeder throat. Here the rocks dropped down past counterweighted doors to a Pioneer primary jaw crusher, 30 x 48 inches, set at 4-inch clearance. Stones up to 22 inches in size could easily be handled by this primary crusher, and there were instances where rock slivers 48 inches long on one dimension were fed through this machine. The power-driven feeder belt permitted the operator to control incoming rock so that it seldom choked the feeder throat. A Yale 3-ton hoist over this throat removed occasional large rocks if the grizzly crew's judgement was poor, but it very rarely had to be used. This crusher, driven by a 6-cylinder Waukesha gasoline engine, reduced all the large stones and dropped them to a 30-inch conveyor belt leading up to the first screen. This belt also carried the initial fines which passed through the slotted grizzly openings.

The 30-inch conveyor belt, running over idlers spaced on 24-inch centers, dumped on the upper end of a single-deck 2-inch-mesh vibrating screen. Minus-2-inch rock dropped through to the out-going conveyor, and all plus-size stones retained here passed through a Pioneer roll crusher set at 2-inch clearance, and also driven by a Waukesha gasoline engine. A 30-inch conveyor belt then carried this rock, along with that which passed the screen, to a single-deck vibrating screen with 1-inch mesh. Minus rock passed down to a conveyor belt leading out to the finished stockpile. Plus-size rock went through another Pioneer roll crusher set at ¾-inch clearance, but instead of then going to the stockpile, it again passed over a system of two conveyor belts, back to the 1-inch vibrating screen. Any rock left oversize was thus re-routed until reduced to size.

Crushed rock coming off the conveyor to the stockpile had to be moved 220 feet to the asphalt-plant trap doors. A Caterpillar D7 with a LeTourneau bulldozer was able to handle the 120-ton-per-hour demand imposed by the asphalt plant.

No laboratory sieve analyses were made of the crushed rock, because screening sets were not available. The writer took a 30-pound sample off the end of the conveyor belt at the stockpile, hauled it 25 miles, and screened it on a set of Navy laboratory screens with the following results:

Screen Size	Per Cent Retained	Per Cent Passing
¾-inch	1	99
½-inch	33	67
No. 4	49	51
No. 10	70	30
No. 40	85	15
No. 60	89	11
No. 200	93	7

This result was within the aggregate design in general use on Guam, both for highways and airfields. In checking this rock, a representative sample was taken and the rock was well shaken through the screens.

The Army Engineers used the following crew to quarry and crush the rock:

1 Captain, Corps of Engineers, U.S. Army
1 Lieutenant, Corps of Engineers, U.S. Army
1 Sergeant as quarry foreman
1 Sergeant and 10 NCO's drilling
1 Shovel operator and oiler
5 Powdermen
1 Bulldozer operator
4 Truck drivers
1 Toolroom keeper
1 Sergeant and 3 NCO's on primary crusher
4 NCO's on the other crushers
1 Oiler

Asphalt Plant

The asphalt plant was composed of two portable Barber-Greene driers, a Barber-Greene pugmill, two Barber-Greene elevators, a Kewanee steam boiler, conveyors, asphalt tanks, and piping. The crushed rock was fed through a sliding gate in the roof of a

(*Continued on next page*)

WON'T QUIT
or cause time out

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

•

The Hayward Company
32-36 Dey Street
New York, N.Y.

Hayward Buckets

The Finest Performing Pumps Available

THE Army and the Navy have literally "poured it on" Barnes Pumps all through the war. Day in and day out, Barnes Pumps have stayed in there pumping and working without a "break"—asking only for more water. And if given the job, these pumps will do the same for you.

No wonder construction men who know pumps claim that Barnes gives them more gallons of water for their pumping dollar. These pumps are fast, sure, and steady.

Whether you want a "trickle or a torrent," there's a Barnes Automatic Centrifugal Pump to fit your job without waste of capacity or operating dollars. Made in sizes to deliver from 3,000 to 90,000 gallons per hour.

ATTENTION DISTRIBUTORS! A number of territories are still available. Write, wire or phone!

BARNES MANUFACTURING CO.
Quality Pump Manufacturers for 50 Years
MANSFIELD, OHIO

McCAFFREY TRACTOR SHOVEL
WITH RUD-O-MATIC CONTROL

These Features Make It Your Best Choice—

100% CABLE CONTROL OF BUCKET
Permits gradual dumping of the load.

★

WEIGHT CENTERED ON TRACTOR FRAME—

★

BUCKET CAN REACH OVER CENTER OF TRUCK BEING LOADED—

★

RIPPER CARRIED ON MACHINE READY FOR IMMEDIATE ACTION—

★

LOW OVER-ALL HEIGHT FOR TRANSPORTING—

DIGS • GRADES • RIPS • LOADS

M. P. McCAFFREY, INC.
2121 East 25th Street • Los Angeles 11, California
Kimball 7181

Guam's Airfields

(*Continued from preceding page*)

tunnel under a stockpile to a 30-inch conveyor belt, driven by a 4-cylinder Wisconsin engine through a 4-belt V-belt drive. The rock was carried 50 feet and fed to an inclined 30-inch conveyor belt which dropped it into the first set of Barber-Greene driers. The conveyor, driven by a 6-cylinder Buda, was also 50 feet long and inclined at a 30-degree angle.

Since surface drying was planned to be the sole function of the primary drier, not a great deal of heat was expended through the burners. A Barber-Greene cold bucket elevator took the surface-heated aggregate to the secondary drier, where the rock was heated to 325 degrees F. Since this plant had no system of dust recovery, some of the fines left the drier stacks, blown out by the terrific draught of the burners.

A hot elevator then dumped the rock into a hot storage hopper at the pugmill where it was used without losing its heat. A steel belt, operated by the pugmill operator, passed the aggregate into the mix. Calol bitumen, with a 60 to 70 penetration, was used at the rate of about 5½ per cent by weight.

Handling Asphalt Drums

Asphalt handling at Guam was a tedious business, because all asphalt arrived in 52-gallon drums. Their hauling and opening entailed considerable time and trouble. It required 16 hours to dump enough asphalt to run the plant one 8-hour shift. Often, on one type of asphalt barrel, the top popped off when a drum was dumped off a truck, leaving a black sticky mess to be cleaned up. The only way to get the asphalt out was to melt it with a drum torch, and frequently the 2,000-degree heat of the torch flame ate right through the thin metal of an asphalt drum and ignited the bitumen. Two 40-gallon Foamite fire extinguishers stood by in constant readiness to put out fires, but the walls and studs of the hoisting engineer's shack became blackened and seared from close escapes.

After removing the top of the asphalt barrels by an air-driven chisel, each drum was raised by tongs on a small cable-driven hoisting engine, and brought to position over the melting vat. The flame from the drum torch softened the bitumen and it dropped out sluggishly. The empty drums were flattened and hauled away by a clean-up crew.

Colored Engineer troops heated the drums of asphalt with a diesel-fuel torch and dumped them into the melting vat.

The bitumen was dumped into a middle section of a 15,000-gallon concrete receiving tank, or melting vat, in order to allow it to reach 250 degrees before entering the pumping system or w tanks. Part of the bitumen be dumped was cold and lumpy, of cou and many hours elapsed before steam coils heated it sufficiently make it overflow to the two other he ing compartments where the steam h was brought up to 300 degrees. A H cules-gas-engine-driven pump mo the liquid asphalt to two 4,000-ga steel work tanks, where it was t sent to the pugmill by a metering pu

Steam capacity was about 250 furnished by a Kewanee fire-tu boiler. About 3,750 gallons of 50-cet diesel fuel was used per day for fir this boiler, instead of the black Bunk C heavy fuel normally used in this ki of set-up. From 8,000 to 10,000 gall of fresh water was required daily, a this was all hauled in by truck, carryi 5 x 5 x 7-foot steel pontoon cells wh held about 1,400 gallons of water. 315-cfm Chicago Pneumatic air co pressor furnished air for use arou this plant.

(*Concluded on next page, Col. 2*)

Above: Type "F" full-circulating spraybar handles highest temperature bitumen and keeps hot material circulating immediately back of the nozzle valves in either folded or extended position.

Left: Type "H" header-circulating spraybar has right and left cut-off valves in header—quick cut-off at nozzles by reverse suction. When folded, extensions cut off automatically—a patented feature.

ROSCO ORIGINATED the folding type spraybar, now universally accepted and proven through years of outstanding performance, and used on all Rosco Bituminous Distributors. Rosco spraybars are designed with oversize piping and without internal gadgets or inside tube restrictions. This provides free and unobstructed flow of materials to nozzle—insuring uniform pressure over length of bar. *When folded,* Rosco bars provide more than ample road clearance, and may be lifted when traveling to maintain a 21″ ground clearance. *When extended,* a center safety breakpin eliminates breakage of bar caused by any road obstruction, allowing each half of the bar to pivot without spillage—a two-fold economy feature.

THE ROSCO METHOD follows a basic hydraulic principle, is automatic in action and provides control from rear platform—guarantees operating pressure at spraybar nozzles. No pump metering method is used—requires only normal pump speed for light or heavy application. This control, plus multiple directional material flow, and built-in mechanical reverse suction, is possible with the Rosco Patented Seven Way Master Valve—mounted in front with pump and engine. Bitumen application rates are positively measured and uniformly spread, exclusive with Rosco.

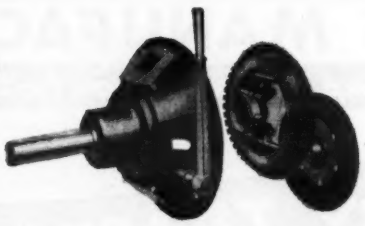
For further information, contact your nearest Rosco dealer or write us. Place your order now for delivery in 1946.

ROSCO MANUFACTURING CO.
3118 SNELLING AVE. • MINNEAPOLIS 6, MINNESOTA

ROSCO MINNEAPOLIS
DISTRIBUTORS MAINTAINERS
BROOMS APPLICATORS TAR KETTLES FLUSHERS

Specify for ROCKFORD POWER TAKE-OFFS

SELF CONTAINED UNIT *
WIDE RANGE OF SIZES
CONSERVATIVE RATING
ROLLER BEARINGS
FINE ADJUSTMENT
ACCURATE BALANCE
S.A.E. DIMENSIONS



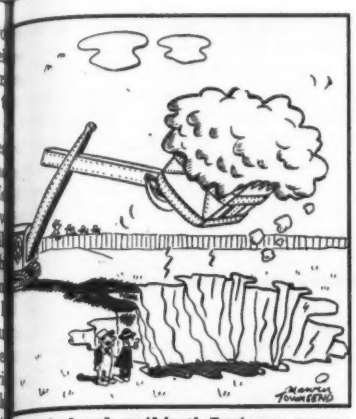
* The housing supports the drive shaft, which is mounted on a main bearing in the housing and a pilot bearing in the engine flywheel. The clutch is mounted on the drive shaft, which is extended to serve as the output shaft for the external drive, and may carry a pulley, gear, sprocket, or drive direct — through a coupling.

SEND FOR THIS HANDY BULLETIN ON POWER TRASMISSION

It shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications. Every production engineer will find help in this handy bulletin, when planning postwar products.

ROCKFORD CLUTCH [FORMERLY KNOWN AS DRILLING MACHINE] DIVISION BORG-WARNER CORPORATION
314 Catherine Street, Rockford, Illinois, U. S. A.

ROCKFORD CLUTCHES
SPRING LOADED OVER CENTER ONE-WAY SPRING LOADED LOE POWER TAKE-OFF FULLMORE MULTIPLE-DISC OVER CENTER



"Atomic bomb nothing! Just one scoop of our post-war excavator!"

Oil-Clarifier Line To Protect Engines

The Briggs G and F-Series oil clarifiers are designed for lubrication-oil filtration on light and medium-duty mobile or stationary gasoline, natural-gas, and diesel engines, and for fuel filtration on diesel and gasoline engines with 5 to 10-gph fuel consumption.

G-Series lubrication-oil clarifiers, which are relatively small-capacity units and are adaptable to hydraulic-control systems as well as various types of engines, embody the feature of refill interchangeability, and either fuller's earth or Discel may be used. The cover assembly is removable as a unit, to simplify changing refills. A built-in relief valve maintains the correct pressure differential across the refill. Adjustable brackets are provided for direct attachment to the engine.

In operation, the oil flows upward through the clarifier around the refill cartridge. Part of the oil passes through the cartridge and is clarified, and this oil enters the refill center tube and passes into a hollow center stud. Oil that does not pass through the refill cartridge enters the hollow cap screw and discharges through the relief valve into the hollow center stud. Both are discharged from the center stud through the outlet.

The F-Series clarifiers for fuel filtration are available in two models. F-5 is designed for gasoline and diesel engines with a maximum consumption of 5 gph. Its small compact design makes it adaptable for use on engines powering such mobile units as trucks, tractors, cranes, pumps, and similar equipment. Model F-10 is for use on larger units and is specially suited for stationary installations. Two-piece adjustable steel mounting brackets are supplied. In these clarifiers the fuel enters through the oil inlet and fills the refill cartridge compartment. Pressure from the engine's fuel supply or transfer pump forces the fuel through the refill cartridges where it is clarified. After clarification, the clean fuel flows into the clean oil compartment or manifold and through the oil outlet. Sludge which is removed settles in the bottom of the clarifier and may be taken out periodically through the sludge drain.

Further details on the operation of these clarifiers are contained in Index 102, copies of which may be secured direct from the Briggs Clarifier Co., 3339 Wisconsin Ave., N.W., Washington 16, D. C. Just mention this item.

VULCAN TOOLS

A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

Vulcan Tool Manufacturing Co.

35-43 Liberty Street, Quincy 7, Mass.

Branch Offices and Warehouse Stock:

74 Murray St. New York 7, N. Y.
34 No. Clinton St. Chicago 6, Ill.

Guam's Airfields

(Continued from preceding page)

The asphalt-plant crew, for the three shifts, was divided as follows:

Day Shift
1 Captain, Corps of Engineers, U.S. Army, in charge
1 Sergeant as plant foreman
1 Sergeant and 2 men on pugmill
2 Oilers
1 Pit man, to tend conveyors
1 Asphalt-truck spotter and counter
1 Electrician
1 Steam engineer on boiler
1 Sergeant and 6 men melting asphalt
1 Truck driver hauling diesel fuel
2 Truck drivers hauling water
1 Mechanic

Swing Shift
1 Sergeant and 6 men melting asphalt
1 Electrician
1 Steam engineer
1 Mechanic for routine repairs and adjustments

Graveyard Shift
1 Electrician
1 Mechanic
1 Steam engineer

The ordinary haul from the asphalt plant to the B-29 strip was about 6 miles one way. Diamond T trucks, when loaded with bituminous mix, had certain rights of way on Guam, and made this round trip in about 35 minutes.

Personnel

Those men who manned the quarry, rock crushers, and the asphalt plant since operations began on January 17, 1945, all deserve generous credit for a job well done. In six months, this plant batched 115,000 tons; enough to lay 920,000 square feet of runway.

This project was operated under the general direction of Commodore W. O. Hiltabidle, Jr., CEC, USN, Officer in Charge of Guam's Naval Construction Brigade. He was succeeded on June 17, 1945, by Captain G. T. Dickeman, CEC, USN. Field officers included Lieutenant Colonel R. C. Parry, Corps of Engineers, U. S. Army, who was the Aviation Engineer Battalion commander; Captain J. P. Williamson, Captain J. P. Mulqueeny, and 1st Lieutenant George H. Connell. T/3 James E. Davis of Woodland, N. C., was the asphalt-plant foreman.

The armed forces have done their job in winning the victory. Let's finish ours by buying Victory bonds!

OPA Approves Price Boost

Manufacturers and resellers of construction equipment listed in Construction Machinery Order MPR 136 have been authorized by the OPA to increase, by not more than 5 per cent, the base date maximum price on 99 items of machinery and equipment until the end of the year. An amendment, effective September 28, provides for this increase which applies to the sale, or repair or replacement part, of such equipment to any purchaser. A report setting forth the new price must be filed with the OPA in Washington.

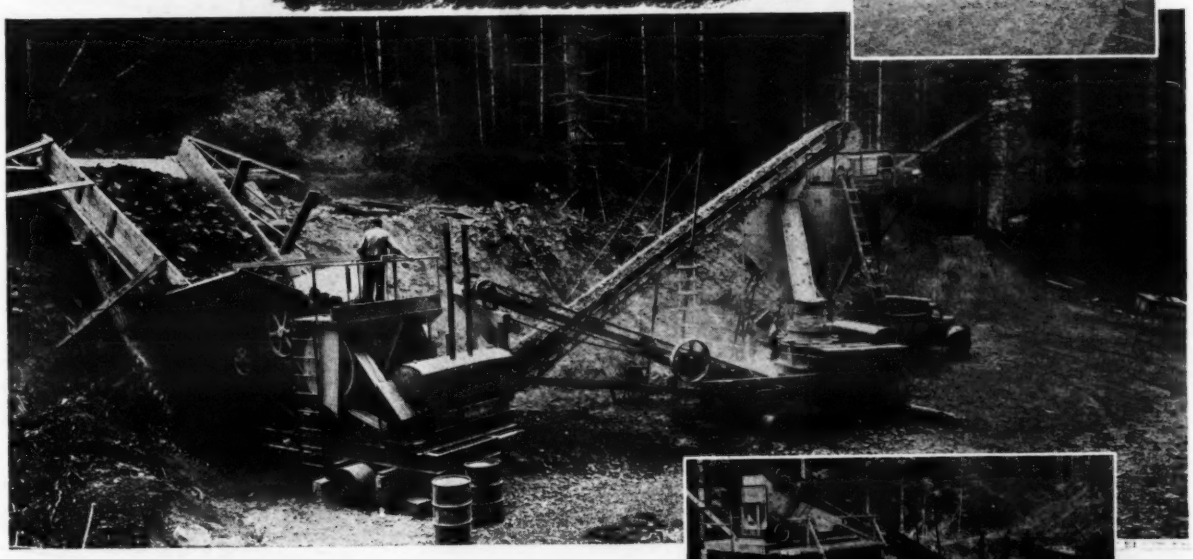
Promotion at LeTourneau

Walter N. Fischer, Manager of the War Contracts Division, has been named to fill the newly created position of Assistant to the General Sales Manager for R. G. LeTourneau, Inc., Peoria, Ill. Mr. Fischer was associated with Schramm, Inc., before joining LeTourneau four years ago.

Crushing Hard Rock for Oregon Logging Roads..

TELSMITH

PORTABLE CRUSHING PLANTS far exceed expected capacity!



• To provide faster, more economical timber transportation, Weyerhaeuser Timber Co. is building its own roads and super-truck highways.

To turn out the required aggregate *fast* and *economically* they're using two Telsmith Portable Crushing Plants in the timber country of Oregon and Washington.

Each is a Telsmith Two-Unit Portable Crushing-Screening Plant with an 18″ x 32″ Primary Jaw Crusher with feeder, a 28″ Intercone Secondary Crusher, conveyors, vibrating screen, power units, and steel bin.

These logging roads are being built to highway specifications. When producing a minus 4″ plus 1″ aggregate for base course and a minus 1″ for top course, with the Primary Jaw Crusher set at 3″, and 100 per cent of the material being crushed, these Telsmith Portable Plants average 75 cu. yds. per hr. When producing a straight minus 1″ aggregate for top course, they average 40 to 50 cu. yds. per hr. The rock is very hard and tough, but plant capacity has more than met expectations.

For private logging roads — or any highway anywhere—Telsmith Portable Crushing-Screening Plants will produce the aggregate more economically. *Get Bulletin P-34.* P-9

SMITH ENGINEERING WORKS, 4014 N. HOLTON STREET, MILWAUKEE 12, WISCONSIN

Cable Addresses: Sen2works, Milwaukee—Concrete, London

51 East 42nd St. New York 17, N.Y. · 211 W. Wacker Drive Chicago 6, Ill. · 713 Commercial Trust Bldg. Philadelphia 2, Pa. · 247 Third Street Cambridge 42, Mass. · Boelck Eqpt. Co. Milwaukee 3, Wis. · Mines Eng. & Eqpt. Co. San Francisco 4—Los Angeles 14

Brandeis M. & S. Co. Louisville 8, Ky. · Rish Equipment Co. Charleston 22, & Clarksburg, W. Va. · Rish Equipment Co. Roanoke 7, & Richmond 10, Va. · North Carolina Eqpt. Co. Raleigh and Charlotte 1, N.C. · Wilson-Weesner-Wilkinson Co. Knoxville 8, & Nashville 6, Tenn.

New Railway Will Be A Transandean Link

Forecasts of the early completion of the Salta-Antofagasta Transandean Railway, linking Argentina and Chile, are of interest because of the engineering problems in the construction of this 559-mile railroad, as well as because of the economic importance of the region.

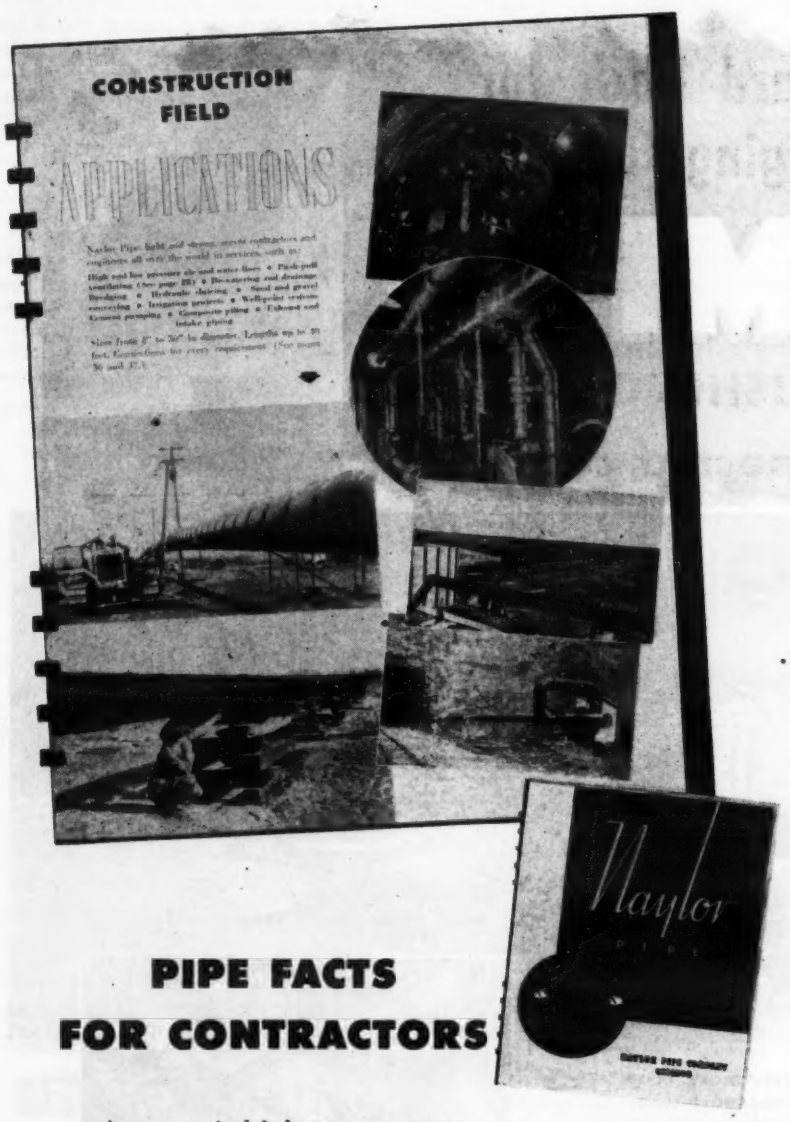
In an article on this Transandean link in a recent issue of *Foreign Commerce Weekly*, Robert J. de Camp, Chief of the Railroad Division, Department of Transportation, Office of Inter-American Affairs, reports that on the Chilean side the railway is now completed and in operation to within 35 miles of the Socompa Pass, and the roadbed is finished without rails to within 14 miles of the border. On the Argentine side, track has been laid and trains are now operating for 250 miles from Salta to Tolar Grande, and the roadbed has been complete to 73 miles beyond that point, leaving 30 miles of roadbed to be completed to reach the border.

The most difficult engineering work is met with as the line turns westward to climb out of the Toro River valley in Argentina to reach the high Alpine-desert plateau across which most of it runs. At two points the line describes complete circles on itself in ascending; at another point five tiers of tracks are used to climb the side of the valley, it being necessary to travel 8 miles to progress 1 mile. At San Antonio de los Cobres the elevation is 11,073 feet. Some few miles beyond San Antonio the line crosses the 800-foot Polvorilla Viaduct, which is 230 feet high. The highest point in the Argentine section is at 14,173 feet, while the elevation at Socompa Pass, on the border, is 12,821 feet above sea level.

The Argentine section of the line, when finished, will be 353.5 miles and will have twenty-one tunnels totaling 10,600 feet, thirteen steel viaducts totaling 4,120 feet, and fifty steel bridges with a total length of 2,641 feet.

On the Chilean side, the railway, which is of 1-meter gage, presents no unusual engineering features, as the rise is gradual from sea level to the pass at 12,821 feet.

The first survey for the railway was made in 1898. In order to climb to the high tableland, the original plans called for heavy grades, numerous stretches of track with grades up to 7½ per cent, and many tunnels. Construction was begun in October, 1911, but was discontinued after only a small amount roadbed had been completed. In 1 the Argentine government took o all rights to the concession, and n surveys were made with modificati to eliminate the steeper grades. T maximum gradient was fixed at 25 1,000, and a minimum curve radius 150 meters (approximately 164 fe was adopted.



PIPE FACTS FOR CONTRACTORS

As a practical help to contractors, the new Naylor Catalog provides a wealth of information on the use of light-weight pipe in the construction field. Along with this valuable data, you will find the first complete story on the new Naylor Wedge-Lock Couplings which revolutionize pipe connection methods and offer contractors advantages never before possible. If you have not already received your registered copy of this illustrated book, write for it today.

NAYLOR LOCKSEAM SPIRALWELD PIPE

NAYLOR PIPE COMPANY
General Office
1270 EAST 92ND STREET • CHICAGO 19, ILLINOIS
New York Office
350 Madison Avenue • New York 17, N. Y.

Brownhoist Buckets

ROPE REEVE • POWER WHEEL • LINK TYPE

Handling ore, gravel, coal or dirt Brownhoist Buckets do a better job because: 1) Larger sheaves reduce rope wear, 2) Heavy carbon-steel digging lips take deep clean bites, 3) Extra-sturdy construction insures long-life. Write to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York, Philadelphia, Pittsburgh, Cleveland and Chicago.

"For tight spots and tough going"

We know the problems that threaten your profit on many jobs . . . unexpected tight spots, soft ground, hard pan, to mention only a few. That's why, feature by feature, we designed the Insley Excavator to work on any terrain, in close quarters . . . to take the "tight spots and tough going" in its stride. That's why you can count on an Insley Excavator to help you whip every difficulty, to get your job done . . . in less time . . . with greater profit for you.

From now on there'll be plenty of Insley Excavators to assure you profit on your "bids." Contact your Insley Dealer today about a new ⅜ or ½-yd. Insley Excavator. Designed for five interchangeable attachments—shovel, crane, hoe, clamshell and dragline.

EXCAVATORS
INSLEY
CONCRETE EQUIPMENT

INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.

S. Marine Corps Photo
tal aviation fuel for the U. S. Marine Corps was delivered at Mindoro in the Pacific by barges powered by Murray & Tregurtha Harbormaster units.

ubgrade Compaction Discussed in Report

The most economical and feasible thod of improving the supporting ver of subgrades and embankments densification by compaction", the ghway Research Board reports in a phlet, Wartime Road Problem No. dealing with "Compaction of Sub- des and Embankments". The Board's clusion is based on studies by the partment of Soils Investigations, and recommendations included in the rt are general and "applicable ver the described conditions pre-

moisture-density studies, the SHO test (T 99-38), which is the most commonly used, is recom- ded as standard. The various soil ifications and their suitability for bankments are discussed and illus- ed by graphs and tables. Formulae presented for moisture and compac- control, and tips given on the con- ction and design of embankments. ills relative to tamping and tamping ipment are listed.

Data gathered from the highway de- tments in the various states are pre- ed and digested in the report. These icate that embankment settlements failures were universal throughout nation. Settlements within the body fill, however, were mentioned only in nection with what are now practi- y obsolete methods of construction. recent times, earth fills have been built in layers, not exceeding 12 inches thick, compacted either by rollers or by hauling equipment or both. In most cases, fills constructed in this manner are allowed to season one winter and spring before pavement is placed on them. Settlement under these conditions has, in general, not been detrimental, especially in the granular types of soil, the report says.

Adoption of moisture and density control methods has greatly overcome difficulties with heavy clays and silts. The majority of the states which do not exercise moisture-density control over compaction, other than by visual inspection, say that it would be desirable to do so, and are planning to use it in the future. Unsatisfactory work in sections close to structures is blamed on the difficulty of obtaining the necessary compaction economically and rapidly with hand tools and even with mechanical tampers.

"In contrast to settlement occuring within the body of the fill, failures such as lateral flow and slipouts causing destruction of road and pavement are rare", the report says. Studies of the more important details of fill-construction practice in the various states are presented. The index covers classification of soils, including tests, sieve analysis, liquid limit, plastic limit, and plasticity index.

The 25-page pamphlet is available from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

New Centrifugal Has Packingless Feature

Described as a "radically new approach to a very old pumping problem", a packingless self-priming centrifugal pump known as Type G, has been developed by the LaBour Co., Elkhart, Ind. Free of rubbing action or close clearance, as the mechanical contact seal is eliminated, this vertical Hydrobalance pump retains and improves on the features of older LaBour pumps, the company states.

Type G has but one running part, the impeller with its integral hydraulic seal. The drive shaft enters the pump on the suction side, requiring the seal to work only against atmospheric pressure, with a maximum pressure differential of 14.7 pounds per square inch. The seal is never subjected to, and is unaffected by, discharge pressures.

To pump air and prime itself, a Hydrobalance pump mixes air with liquid and discharges the mixture, which is then separated so the liquid can return to the pump to collect more air and repeat the cycle until all the air has been eliminated. After removing the air, LaBour Hydrobalance pumps are designed to stop the recirculation by the counterplay of hydraulic pressures, which are balanced within the pump and require no valves, floats, or moving parts.

Type G is adaptable to a variety of common applications such as sump or other drainage, dewatering, supplying water for construction jobs, and similar work. It should be located above the maximum liquid level with all parts of the suction line draining back to the source of supply clear and without any part of the line being above the pump inlet. It may be operated with or without a float switch.

Details of the pump's design features, construction, and operation are to be found in an illustrated 14-page brochure, Bulletin 51, which is available to readers of CONTRACTORS AND ENGINEERS MONTHLY who mention this article when writing the LaBour Co. · Instructions for the installation and care of Type G, operating information, a large chart showing its general layout, and a table of useful information which includes the friction of water in pipes are given.

Safety "Always En Route"

"Those responsible for getting others to work safely should realize that not only are they responsible for the instruction, but that they themselves should also be concerned with learning, so that they may pass on the information so sorely needed in the prevention of accidents" is a timely and important bit of advice in a recent issue of *Construction Safety*. Someone has said that education is not a destination, it is a journey. Always we are en route. The National Safety Council points out that safety work, being an educational process, is similarly "always en route".

"So often foremen say 'I warned that fellow to be careful and not to do it that way'," the article continues. "They think they have arrived at the end of their responsibilities when they have issued instructions only once. Until those instructions are followed without exception, they have let themselves become sidetracked.

"So long as people are getting hurt through accidents, there will be a need for safety engineers who can protect them through instruction, training, and maintenanee of their interest for the elimination or minimization of hazards."

2 MEN DO A DAYS WORK IN 30 MINUTES WITH A Mall CHAIN SAW
REG. U.S. PAT. OFF.

MALL Gasoline Engine Chain Saw. Available in many cutting capacities. Also Pneumatic and Electric models.

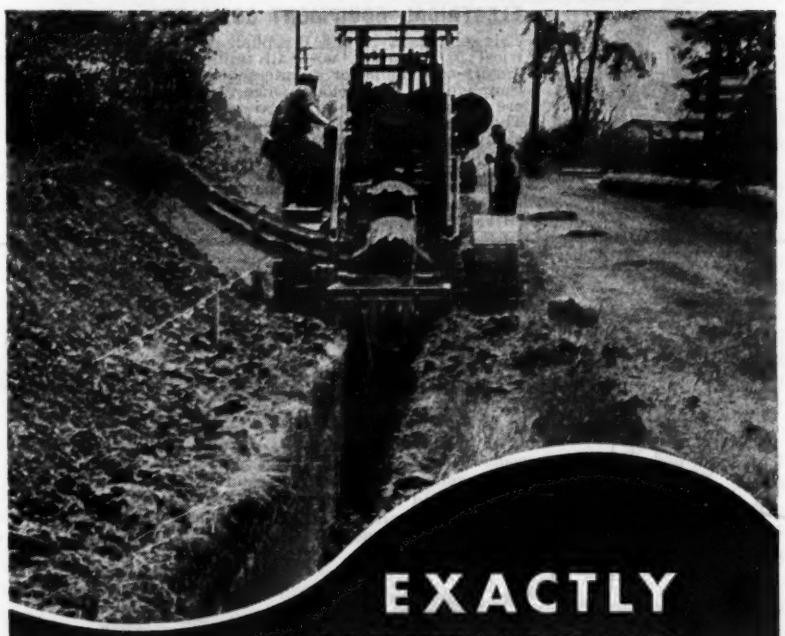
ALL Chain Saw cuts piling, timbers and plank with speed and accuracy—nplifies heavy industrial construction. Powerful 2-cycle gasoline engine handle throttle and stall proof clutch—starts easily—uses very little fuel. degree index permits horizontal, vertical and any angle cuts. Pneumatic dels can be used to cut piling under water. Electric chain sharpeners are ilable.

ite for name of nearest Distributor. Demonstrations can be arranged.

MALL TOOL COMPANY, ★ 7743 South Chicago Ave., Chicago 19, Ill.

Mall PORTABLE POWER TOOLS

"CLEVELANDS"



EXACTLY MEET YOUR TRENCHING REQUIREMENTS

for Oil—Gas—Gasoline—Sewer and Water Lines—Drainage —Telephone and Telegraph Conduit—Building Foundations

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE. • CLEVELAND, OHIO
CLEVELANDS Save More . . . Because They Do More

Money Grants Available For Scientific Research

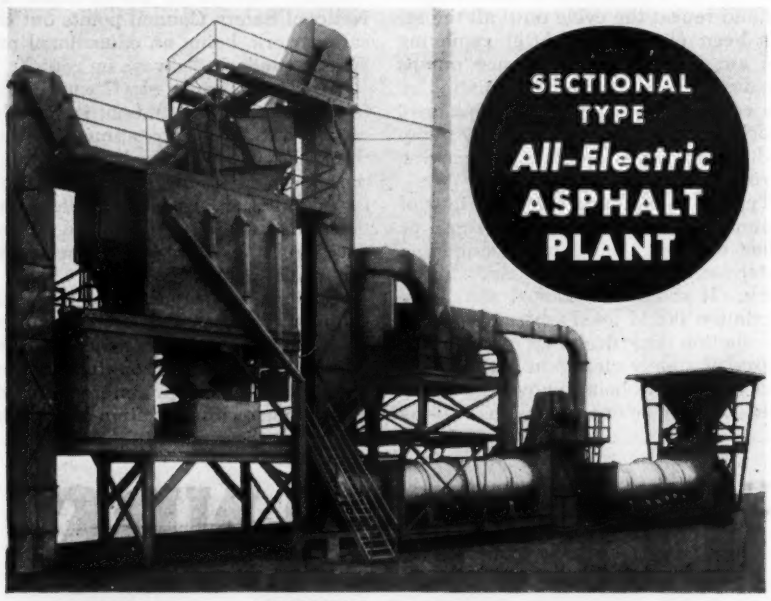
"Science has performed military miracles during the war; she must not neglect to train young men for the problems of peace in the next decade or two", The Research Corp., New York City, says in announcing the creation of a $2,500,000 fund for grants-in-aid to colleges and universities for the training of students in chemistry, physics, mathematics, and engineering.

The monies will go towards facilitating the prompt return to college classrooms of those young scientists who have been occupied with war research. Assisted by the newly created fund, these men will carry on research and teach and inspire the next generation of scientists.

The corporation's program, to extend over a five-year period, will result in 100 to 200 annual grants of between $2,500 and $5,000 for talented young scientists who have been engaged for the most part in war research, in uniform or as civilians. The grants will be made to the institutions at which the scientists will work and teach, with the funds allotted being available for the purchase of needed equipment and the employment of assistants.

"For the past four or five years", says Dr. J. W. Barker, Acting President of Research Corp., "the Government has supported a vast research and development program into which has been drawn the great majority of the most competent university research men." These projects are now being demobilized, and there is danger that the educational institutions will lose these men permanently because of the attractions of industrial employment and of the inability of the schools to underwrite research.

Persons of proved research abilities who are desirous of entering or reentering the faculties of colleges may apply for grants to these institutions, giving the Research Corp. details concerning their background, future plans, the attitude of the school towards the project, the school's facilities, and an estimated budget. Grants will be made to the schools, though criteria for judging the applicants will rest, primarily, on the individual's qualifications. Full details may be secured from Dr. Robert R. Williams, Research Corp., 405 Lexington Ave., New York 17, N. Y. The organization is supported by revenues from patents deeded it by the inventor. The current grants are made possible by the fact that during the war years research programs that would normally have been supported by the corporation were cancelled so as to free men and facilities for war research.



H&B ESTABLISHED 1907

ELECTRICAL EQUIPMENT COMPLETELY INSTALLED

This sectional type H & B asphalt plant is completely electrical in operation, with all units driven by individual motors—no chains or countershafts. All units are wired completely at our factory. Once the plant is assembled you are ready to hook up to the power line and start operating. The plant is quickly assembled and disassembled, and easily portable. Refinements in design include a larger fan, new horizontal cyclone dust collector and new type screen, making for greater compactness and increased efficiency. Write for complete information.

HETHERINGTON & BERNER INC.
731 Kentucky Avenue — Indianapolis 7, Indiana

Lighter Load + Longer Life
= LOWER SHOVELING COSTS
It's time to check the shovels you've been buying against the advantages of the modern RAZOR-BACK:
(1) The strongest light shovel ever made—of 13 ga. thickness up the middle where a shovel gets all its wear and strain, tapering to 17 ga. at the sides and with 11" long socket.
(2) Tubular shank with deep hang and perfect working balance.
(3) "Surface Peened" to stand more punishment, do more work.
Send for Catalog, Prices and Distributor's Name
THE UNION FORK & HOE CO.
662 Hocking St., Columbus 15, Ohio
SURFACE PEENED
"SURFACE PEENED"—Every shovel "cold-worked" following heat treatment,—tests 2½ to 5 times tougher than fine shovels merely heat treated.
RAZOR-BACK
THE ONLY SHOVEL WITH A BACKBONE
ALSO STONE, BALLAST INDUSTRIAL FORKS — ASPHALT AND ROAD RAKES

Easy WHEELING IN ANY WEATHER!

Rain or shine, you can always depend on Sterling performance. That's because Sterlings are "EASY-WHEELING" barrows, veterans of long, successful service in fields of construction and throughout industry. A limited number of all-steel tubular barrows is now available. (Sorry . . . we will not be in a position to ship wood-handled barrows for some time to come.)

No. S8 RF

Narrow, 3½ cu. ft. struck capacity tray, 16 gauge steel — all-welded — no rivets — lapped at corners — steel reinforcing rod around top edge — V front braces and cross supports. Pneumatic tires, if desired. Ideal for construction work or industrial hauling. Write for circular.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

A 4871-1

Osgood

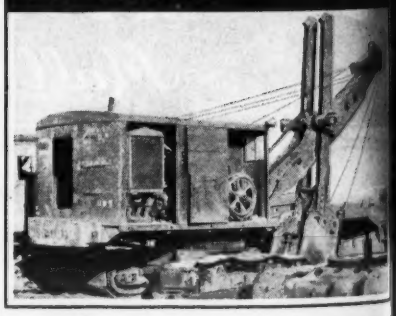
PROVED IN SERVICE

9-Year-Old Osgood Shovel Brings Top Price in Surplus Equipment Sale

THE RECORD

Manufactured in 1936, this 1½ yard Osgood shovel had already turned in nine years of faithful service when it was offered at a recent surplus equipment sale. The bidders, experienced construction and excavating machinery dealers, knew the machine had been in service on the Alcan highway project for nearly two years; working under the most adverse conditions, with only sketchy provisions for maintenance. This Osgood, nine years old and offered "as is," brought the highest price of any of the 1189 pieces of equipment in the sale!

THE MACHINE



Even after it had gone through nine years of grueling service, this Osgood shovel looked good to the experienced construction machinery dealers who were bidding on it. Every one of the bidders was banking on the stamina built into every Osgood machine . . . they knew that there still were years of service left in this veteran.

That's what engineered design and precision manufacture means—long-lived, dependable, trouble-free service. It's an important fact to keep in mind when you're selecting your new equipment for postwar projects. We'll be glad to send complete information on the complete line of Osgood construction, excavating and materials handling equipment . . . to tell you how and why Osgoods will stay on the job, day after day, turning in better performance records at lower cost.

THE GENERAL EXCAVATOR COMPANY
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company

OSGOOD

THE OSGOOD COMPANY • MARION, OHIO

OSGOOD SHOVELS, DRAGLINES CRANES

...les Appointments At Buffalo-Springfield

...J. Hazeltine, formerly Vice Presi... in charge of distribution, has been ...ed General Sales Manager of the ...falo-Springfield Roller Co., Spring... Ohio. A member of the Advisory ...mittee of the Construction Machin... Branch of the OPA, Mr. Hazeltine ... been associated with Buffalo-...ngfield since 1922, serving first as a ... representative. In recent years he ... responsible for establishing the ... nation-wide distributor system. ...ffalo-Springfield has also an...nced sales appointments for its cen... and western districts. W. H. Mc...nen, associated with the firm since ...9, will act as Central Sales Manager ...h headquarters at Springfield, cover... Ohio, Indiana, Michigan, Illinois, ...a, Wisconsin, Minnesota, North Da...a, South Dakota, Nebraska, Kansas, ...lahoma, Texas, Louisiana, Missouri, ...ansas, Mississippi, Alabama, Ten...nessee, and Kentucky. R. J. (Bob) Cleary will handle the Western Zone, comprising Washington, Oregon, California, Idaho, Montana, Nevada, Utah, Arizona, New Mexico, Colorado, and Wyoming. In the construction field more than 15 years, Mr. Cleary was with the Army Engineers Supply Department at Cincinnati prior to his B-S appointment.

Replacement-Sales Mgr.

Raybestos Division of Raybestos-Manhattan, Inc., brake-lining manufacturer, has announced the promotion of James L. McGovern, Jr., Supervisor of Replacement Field Sales at Bridgeport headquarters, to Replacement-Sales Manager. With the firm 21 years, Mr. McGovern formerly served as Sales Manager for the Eastern Zone.

At the same time Jerome W. Brush, Jr., formerly Manager, Rubber Products Division, was named Merchandising Manager.

DON'T THROW AWAY BROKEN PARTS—

Repair-Weld Cast Iron with

P&H "HARCAST"

You can make immediate repairs — save time — save money — keep equipment on the job longer with welding. No matter what the metal, there's a P&H electrode to weld it properly.

For example P&H HARCAST welds cast iron to cast iron as well as cast iron to steel. If you haven't used this new electrode for weld-repairing your broken cast iron parts — write us today for a trial sample.

In fact, we can help you no matter what your weld repairing problems might be. Ask about the complete line of electrodes for hard facing against impact and abrasion.

Don't Delay — See your P&H representative or write for full information!

General Offices: 4419 W. National Ave., Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

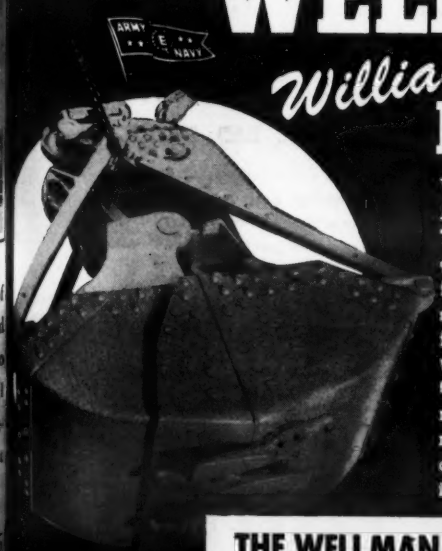
WELDING ELECTRODES • MOTORS • HOISTS • ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

Deep Digging...

WELLMAN

Williams

BUCKETS



Wellman Buckets, in Power Arm and Multiple Rope Types develop great digging power. They bite into frozen ground, hard clay or shale, and come up with full loads.

WELDED ROLLED STEEL CONSTRUCTION for GREATER STRENGTH and LONGER LIFE now featured in all Wellman-Williams Clamshell and Dragline Buckets — 3/8 to 16½ yd. capacities.

THE WELLMAN ENGINEERING CO.

7012 Central Avenue • Cleveland 4, Ohio

Sales and Service Agencies in Principal Cities

Send for Bulletin

Index to Advertisers

Aeroil Products Company ... 63
Agerstrand Corporation ... 21
Aircraft & Diesel Equip. Corp. ... 28
Allied Steel Products Co., Inc. ... 22
Alloy Steel & Metals Company ... 42
American Cable Division ... 10
American Steel Scraper Co., The ... 57
Anchor Coupling Co., Inc. ... 8
Ariens Company ... 72
Athey Products Corp. ... 16
Austin-Western Company ... 62

Baker Mfg. Co., The ... 53
Barber-Greene Company ... 66
Barco Manufacturing Co. ... 80
Barnes Manufacturing Co. ... 82
Beebe Brothers ... 45
Bethlehem Steel Company ... 23, 78
Bicknell Manufacturing Co. ... 74
Blackhawk Mfg. Co. ... 58
Blaw-Knox Division ... 48, 49
Briggs & Stratton Corp. ... 60
Bros Boiler & Mfg. Co., Wm. ... 39
Bucyrus-Erie Co. ... 71
Buda Company, The ... 54
Burch Corporation, The ... 73
Butler Bin Company ... 22

Caine Steel Company ... 43
Calcium Chloride Association ... 60
Case Co., J. I. ... 59
Cataphote Corporation ... 29
Caterpillar Tractor Co. ... 12, 13
C. H. & E. Mfg. Co. ... 41
Champion Chemical Company ... 27
Chevrolet Motor Div. ... 35
Chicago Pneumatic Tool Company ... 18, 19
C. I. T. Corporation ... 15
Cleaver-Brooks Company ... 75
Cleveland Rock Drill Co. ... 69
Cleveland Trencher Company ... 93
Clyde Iron Works, Inc. ... 24
Coast Metals, Inc. ... 31
Complete Machinery & Equip. Co., Inc. ... 33
Connery Construction Co. ... 55
Construction Machinery Company ... 81
Continental Rubber Works ... 38
Cummer & Son Co., The F. D. ... 73

Davenport Besler Corporation ... 53
DeSoto Foundry, Inc. ... 84
Douglas Fir Plywood Association ... 7

Electric Steel Foundry ... 33
Electric Tamper & Equipment Co. ... 42
Erie Steel Construction Co. ... 76
Etnyre & Co., E. D. ... 70

Flink Company, The ... 74
Foote Co., Inc., The ... 32
Ford Motor Company ... 25
Fulton Bag & Cotton Mills ... 10

Galion Iron Works & Mfg. Co., The ... 41
Gardner-Denver Co. ... 85
Gar Wood Industries, Inc. ... 45, 83
Gatke Corporation ... 23
Goodall Rubber Company, Inc. ... 79
Gray Company, Inc. ... 26
Griffin Wellpoint Corp. ... 88

Haiss Manufacturing Co., Inc., George ... 58
Harnischfeger Corporation ... 95
Hayward Company, The ... 89
Heil Co., The ... 56
Hercules Steel Products Co. ... 82
Hetherington & Berner Inc. ... 94
Highway Steel Products Co. ... 50
Hobart Brothers Company ... 56
Huber Mfg. Co., The ... 52
Hyster Company ... 27

Industrial Brownhoist Corp. ... 92
Ingersoll-Rand Company ... 57
Insley Manufacturing Corp. ... 92
International Harvester Co. ... 63
International Vibration Co. ... 76
Iowa Manufacturing Co. ... 87
Isaacson Iron Works ... 11

Jaeger Machine Co., The ... 8
John Company, C. R. ... 30
Johnson Company, The C. S. ... 80
Keystone Asphalt Products Co. ... 65
Klauer Manufacturing Co. ... 47
Koehring Company ... 31

Laclede Steel Co. ... 42
LaCrosse Trailer & Equip. Co. ... 77
Lansing Company ... 15
LaPlant-Choate Mfg. Co., Inc. ... 40
LeTourneau, Inc., R. G. ... 14, 96
Lewis Equip. Co., H. W. ... 67
Lidgerwood Mfg. Co. ... 79
Linn Manufacturing Corp., The ... 64
Lister-Blackstone, Inc. ... 9
Littleford Bros., Inc. ... 44

Madsen Iron Works ... 38
Mall Tool Company ... 93
Marion Metal Products Co., Inc. ... 28
Marion Steam Shovel Co., The ... 67
Martin Machine Company ... 50
Master Vibrator Company ... 30
McCaffrey, Inc., M. P. ... 82
McCaffrey-Ruddock Tagline Corp. ... 75
McKiernan-Terry Corp. ... 26
Mechanics Universal Joint Div. ... 84
Michigan Power Shovel Company ... 72
Mir-O-Col Alloy Co. ... 20
Monarch Road Machinery Co. ... 68
Murphy Diesel Company ... 59

National Carbide Corporation ... 16
National Production Co. ... 52
Naylor Pipe Company ... 92

Oliver Corp. ... 46
Onan & Sons, D. W. ... 44
Osgood Company, The ... 94
Owen Bucket Co., The ... 65

Page Engineering Co. ... 68
Parsons Company, The ... 21
Pettibone Mulliken Corp. ... 86
Punch-Lok Company ... 58

Rapid Pavement Breaker Company ... 20
Reilly Tar & Chemical Corp. ... 70
Richmond Screw Anchor Company ... 82
Rockford Clutch Division ... 90
Rodgers Hydraulic, Inc. ... 64
Roeth Vibrator Company ... 51
Rogers Bros. Corp. ... 24
Rosco Mfg. Co. ... 90

Sasgen Derrick Co. ... 69
Schramm Inc. ... 14
Seaman Motors Company ... 5
Servicised Products Corp. ... 74
Shunk Manufacturing Company ... 86
Sinclair Refining Company ... 17
Smith Engineering Works ... 91
Solvay Sales Corp. ... 83
Standard Oil Co. of California ... 51
Sterling Machinery Corp. ... 61
Sterling Wheelbarrow Co. ... 94
Stoody Company ... 29
Syntron Co. ... 78

Templeton, Kenly & Co. ... 39
Texas Company, The ... 3, 36, 37
Thew Shovel Company, The ... 9
Tuthill Spring Co. ... 81
Twin Disc Clutch Co. ... 88

Union Fork & Hoe Company, The ... 94
Union Iron Works, Inc. ... 17
United Laboratories, Inc. ... 26
United States Motors Corp. ... 84

Victor Equipment Co. ... 62
Vulcan Tool Manufacturing Co. ... 91

Walter Motor Truck Co. ... 61
Ward LaFrance Truck Div. ... 73
Warren-Knight Co. ... 70
Waukesha Motor Co. ... 68
Wellman Engineering Co. ... 95
White Mfg. Co. ... 54
Wico Electric Co. ... 77
Winpower Mfg. Co. ... 40
Worthington Pump & Machinery Corporation ... 55
Worthington-Ransome Constr. Equip. Div. ... 34, 35
Wyxenbeek & Staff, Inc. ... 88

Contractors and Engineers Monthly

Short haul #7
...2 TOURNAPULLS in St. Louis say:
288 yards...50 minutes...550′ one way
Fast spreading shortens Tournapull cycle time . . . big tires add to compaction on fills.

Contractor R. C. Micotto of St. Louis is using two 15-yard Tournapulls for land leveling in real estate subdivision development around St. Louis. Job illustrated is in the St. Louis Hills Estates, calls for 125,000 cubic yards, which will be moved entirely by LeTourneau equipment. Hauls to date have all been under 800′.

Round Trip Every 4 Minutes

A recent time study made on a 550′ one-way haul showed Tournapulls moved yellow clay at the rate of 12 trips per 50 minute hour . . . making net hourly production for the two units 288 pay yards.

On short hauls like these Tournapulls move more dirt . . . move it faster and cheaper . . . because their working weight compared to power and capacity is much less than slower, crawler outfits —

Prime Mover and Equipment	150 h.p. Tournapull and 15-yd. Carryall	131 h.h.p. Tractor and 15-yd. Scraper Approx.
Weight of Combined Units	31,000 lbs.	53,500 lbs.
Lbs. of Weight per Horsepower	207	411

Note that this difference in weight is the equivalent of 7.5 pay yards. You can't afford to lug that much deadweight back and forth on a 10,000-hour working life when you could be moving extra yardage with a Tournapull.

For instance—compare increased production with Tournapulls on these short hauls (see chart below). You get this increased production because Tournapulls travel 2 to 3 times faster than the fastest crawling tractors, and you can utilize this speed, even on short hauls, because correct ratio of Tournapull weight to horsepower gives quick acceleration to high gear.

In other words — you can move more yardage with less equipment and lower maintenance costs by using Tournapulls on both long and short hauls. You'll find their ability to move major job yardage at lowest-net-cost-per-yard will increase your profits on your land leveling, roadwork, airport, dam, levee and stripping contracts.

For complete facts, see your LeTourneau distributor TODAY.

One-Way Haul	Tournapull — 15-yd. Carryall	Tractor-drawn 15-yd. Scraper	Increased Production per 50-min. hour with Tournapulls	Increased Production with Tournapulls in 10,000 Hours
400′	168	113	55	550,000
600′	150	94	56	560,000
800′	140	81	59	590,000
1000′	130	69	61	610,000

FIGURE THE GAIN TO YOU AT YOUR OWN USUAL BID PRICE.

C20

Smart job planning and operation — Micotto loaded Tournapulls both ways out of the cut, saved turns and pusher time.

LETOURNEAU
PEORIA, ILLINOIS . STOCKTON, CALIFORNIA

JOB-PROVED Over 3700 Built and Shipped

TOURNAPULLS*

*Trade Mark Reg. U. S. Pat. Off.